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Worldwide Report

ENVIRONMENTAL QUALITY

No. 239

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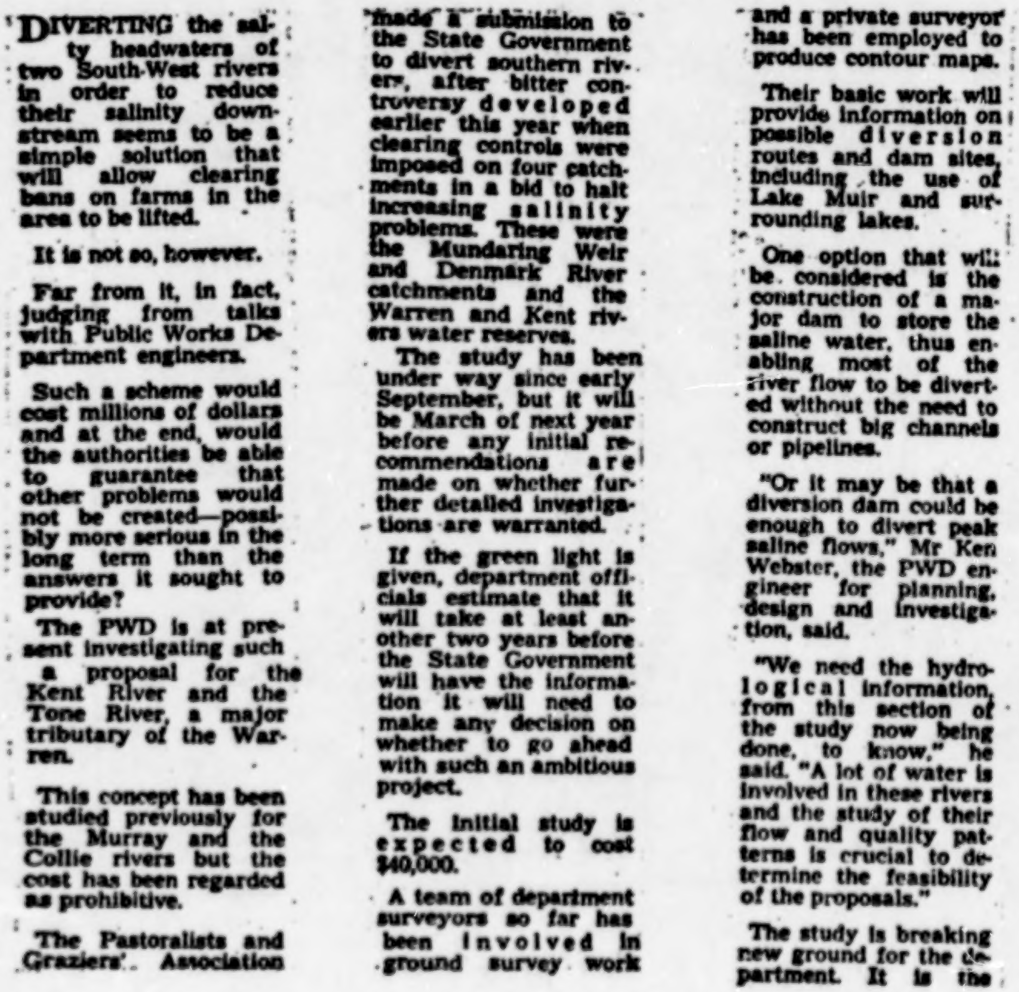
PROBLEM OF SALINITY IN WEST AUSTRALIA DISCUSSED

River Diversion Studied

Perth THE WEST AUSTRALIAN in English 26 Nov 79 p 7

[Article by Michael Zekulich: "A Tough Task, Keeping Salt Down on the Farm"]

[Text]



DIVERTING the salty headwaters of two South-West rivers in order to reduce their salinity downstream seems to be a simple solution that will allow clearing bans on farms in the area to be lifted.

It is not so, however.

Far from it, in fact, judging from talks with Public Works Department engineers.

Such a scheme would cost millions of dollars and at the end, would the authorities be able to guarantee that other problems would not be created—possibly more serious in the long term than the answers it sought to provide?

The PWD is at present investigating such a proposal for the Kent River and the Tone River, a major tributary of the Warren.

This concept has been studied previously for the Murray and the Collie rivers but the cost has been regarded as prohibitive.

The Pastoralists and Graziers' Association made a submission to the State Government to divert southern rivers, after bitter controversy developed earlier this year when clearing controls were imposed on four catchments in a bid to halt increasing salinity problems. These were the Mundaring Weir and Denmark River catchments and the Warren and Kent rivers water reserves.

The study has been under way since early September, but it will be March of next year before any initial recommendations are made on whether further detailed investigations are warranted.

If the green light is given, department officials estimate that it will take at least another two years before the State Government will have the information it will need to make any decision on whether to go ahead with such an ambitious project.

The initial study is expected to cost $40,000.

A team of department surveyors so far has been involved in ground survey work and a private surveyor has been employed to produce contour maps.

Their basic work will provide information on possible diversion routes and dam sites, including the use of Lake Muir and surrounding lakes.

One option that will be considered is the construction of a major dam to store the saline water, thus enabling most of the river flow to be diverted without the need to construct big channels or pipelines.

"Or it may be that a diversion dam could be enough to divert peak saline flows," Mr Ken Webster, the PWD engineer for planning, design and investigation, said.

"We need the hydrological information, from this section of the study now being done, to know," he said. "A lot of water is involved in these rivers and the study of their flow and quality patterns is crucial to determine the feasibility of the proposals."

The study is breaking new ground for the department. It is the most systematic investigation of saline diversion ever undertaken in WA.

A farmer in the catchment area would naturally be hoping for a simple solution so that he could go about his business producing food and raw materials.

But if the initial study becomes an in-depth investigation it will open up a number of issues, of which environmental matters will be significant.

Basic changes in such an eco-system cannot be made without causing other problems.

"We have to be sure we are not causing more problems that we set out to solve," Mr Webster said.

In such a study other departments would be involved to completely background the proposal.

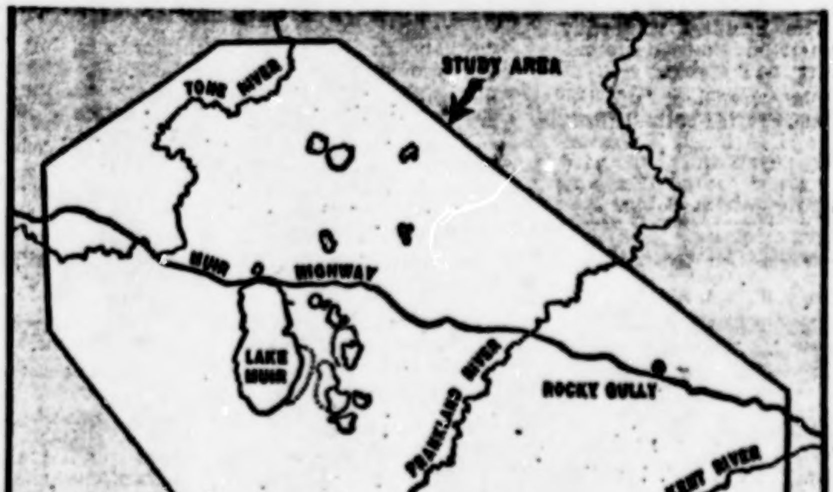
"Collectively, we will have to be able to provide answers to what will happen to the area where the saline water goes, the effect on the lakes and the estuaries," he said.

"Of fundamental importance will be an environmental study to determine the impact on the lake system, including Lake Muir, the Frankland River and the lower reaches of the Warren.

"In the work on salinity we have always recognised engineering solutions as important options along with catchment management measures.

"But we do not believe any one measure is the start and finish of solving the problem—it is far too complex.

"In the end, someone will have to make a value judgment—how much will be gained for what is spent."

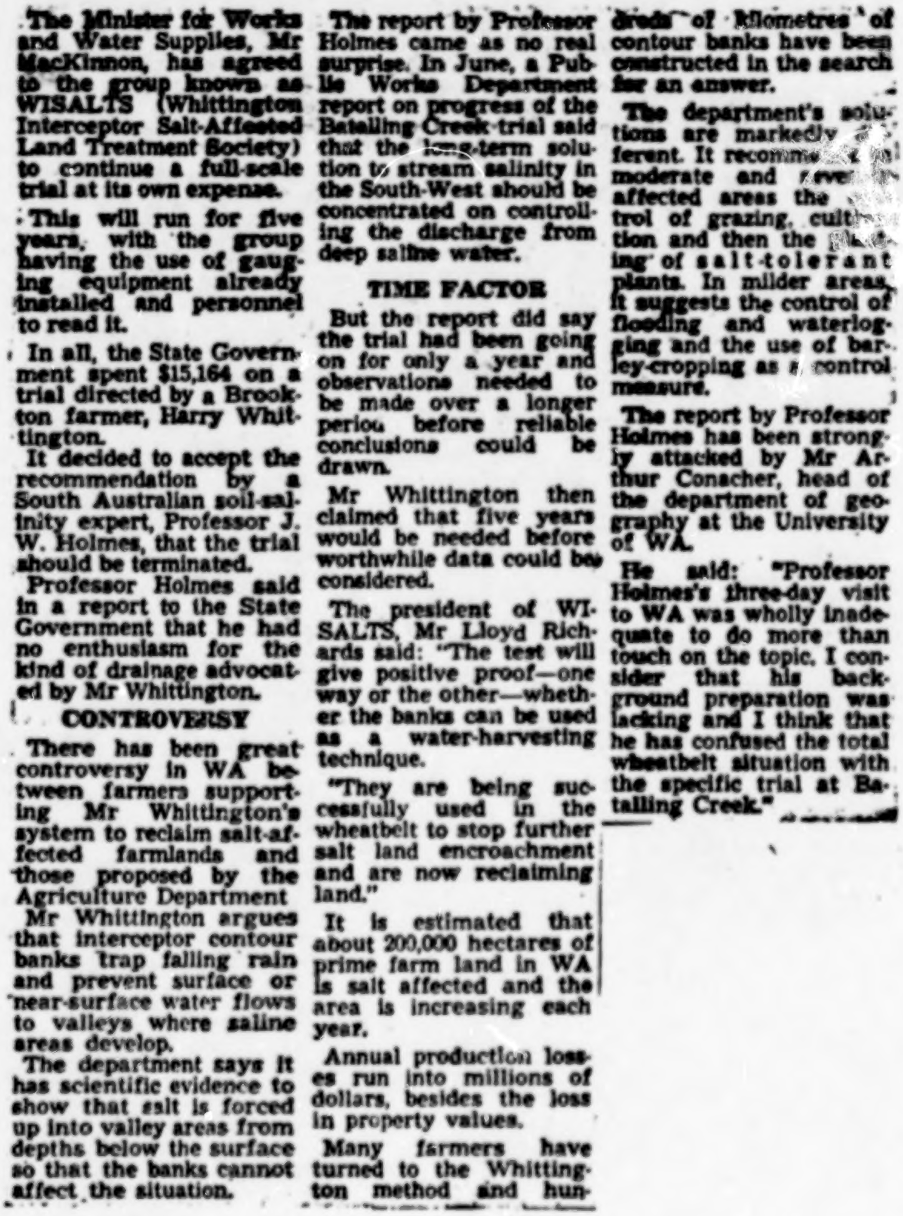


Batalling Salt Trials

Perth THE WEST AUSTRALIAN in English 28 Nov 79 p 42

[Report from Michael Zekulich]

[Text] Salinity trials at Batalling Creek, in the Wellington catchment, are to continue--but without further State Government financial commitment.



The Minister for Works and Water Supplies, Mr MacKinnon, has agreed to the group known as WISALTS (Whittington Interceptor Salt-Affected Land Treatment Society) to continue a full-scale trial at its own expense.

This will run for five years, with the group having the use of gauging equipment already installed and personnel to read it.

In all, the State Government spent $15,164 on a trial directed by a Brookton farmer, Harry Whittington.

It decided to accept the recommendation by a South Australian soil-salinity expert, Professor J. W. Holmes, that the trial should be terminated.

Professor Holmes said in a report to the State Government that he had no enthusiasm for the kind of drainage advocated by Mr Whittington.

CONTROVERSY

There has been great controversy in WA between farmers supporting Mr Whittington's system to reclaim salt-affected farmlands and those proposed by the Agriculture Department.

Mr Whittington argues that interceptor contour banks trap falling rain and prevent surface or near-surface water flows to valleys where saline areas develop.

The department says it has scientific evidence to show that salt is forced up into valley areas from depths below the surface so that the banks cannot affect the situation.

The report by Professor Holmes came as no real surprise. In June, a Public Works Department report on progress of the Batalling Creek trial said that the long-term solution to stream salinity in the South-West should be concentrated on controlling the discharge from deep saline water.

TIME FACTOR

But the report did say the trial had been going on for only a year and observations needed to be made over a longer period before reliable conclusions could be drawn.

Mr Whittington then claimed that five years would be needed before worthwhile data could be considered.

The president of WISALTS, Mr Lloyd Richards said: "The test will give positive proof—one way or the other—whether the banks can be used as a water-harvesting technique.

"They are being successfully used in the wheatbelt to stop further salt land encroachment and are now reclaiming land."

It is estimated that about 200,000 hectares of prime farm land in WA is salt affected and the area is increasing each year.

Annual production losses run into millions of dollars, besides the loss in property values.

Many farmers have turned to the Whittington method and hundreds of kilometres of contour banks have been constructed in the search for an answer.

The department's solutions are markedly different. It recommends in moderate and severely affected areas the control of grazing, cultivation and then the planting of salt-tolerant plants. In milder areas, it suggests the control of flooding and waterlogging and the use of barley-cropping as a control measure.

The report by Professor Holmes has been strongly attacked by Mr Arthur Conacher, head of the department of geography at the University of WA.

He said: "Professor Holmes's three-day visit to WA was wholly inadequate to do more than touch on the topic. I consider that his background preparation was lacking and I think that he has confused the total wheatbelt situation with the specific trial at Batalling Creek."

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AUSTRALIA

INDUSTRY GROUP SAYS LEAD IN GASOLINE NO DANGER TO HEALTH

Canberra THE WEEKEND AUSTRALIAN in English 24-25 Nov 79 p 5

[Report from Bill West]

[Text]

LEAD in petrol does not pose a threat to the public, says the Australian Lead Development Association.

The association, representing various industries, on Friday entered the growing debate over reduction of lead in petrol with a claim that lead in the air was not a significant source of lead in the bloodstream.

A detailed statement released by the association claimed the levels of lead in the blood of Australian schoolchildren were safe.

The statement attacked as unscientific a report called Lead Burdens of Sydney Schoolchildren, which caused an outcry when it was released last year.

The report, which was compiled by three Sydney professors, suggested petrol was responsible for high lead levels in the blood.

"There is no medical evidence to suggest that Australians generally — children or adults — are exposed to excessive quantities of airborne lead," the association's statement said.

"The study on the lead burden of Sydney schoolchildren claims to demonstrate that a major contribution to the lead content of children comes from the air.

"This is contrary to other less-publicised measurements done in Australia and to much of the data in the report itself which is ignored in the author's conclusions.

A spokesman for the Australian Lead Development Association, Mr Brian Hickman, said a study by the Victorian Health Commission showed levels of lead in Australian children were safe.

Mr Hickman said overseas reports showed inhalation of lead contributed comparatively little to lead levels in humans.

CSO: 5000

AUSTRALIA

BRIEFS

CONSERVATION, ECOLOGY--It is very doubtful that any substantial price is paid, in ecological terms, for water conservation benefits, according to a report prepared for the NSW Water Resources Commission. The Minister for Water Resources, Mr Gordon, issued the report yesterday. It was prepared by Laurie, Montgomerie and Pettit Pty Ltd, consulting engineers. Mr Gordon said that the report directed attention to the lack of biological information to support the well-publicised comments of some environmental groups about the adverse ecological effects of water conservation works. The report, covering the Murrumbidgee, Lachlan, Macquarie, Namoi, Gwydire and Hunter river systems, and the Menindee Lakes on the Darling River, examines benefits of water conservation and irrigation works to local communities and the State. It refers to improved conditions created by water storage for fish, birds and other wildlife and discusses recreational benefits and the boost to tourism and decentralisation. [Excerpts] [Sydney THE SYDNEY MORNING HERALD in English 27 Nov 79 p 10]

MELBOURNE AIR POLLUTION--Two inner suburban councils yesterday called for the elimination of lead from petrol within three years. Fitzroy and Collingwood councils, in a joint submission to the Environment Protection Authority, proposed that the State Government introduce tougher emission controls on cars--including a ban on lead. At yesterday's release of the submission, Collingwood's mayor, Cr. Frank Thompson, said air pollution had grown "beyond a joke" for inner areas. He said lead pollution levels in Collingwood were more than twice the acceptable international standard. The submission makes more than 30 specific proposals to tighten the EPA's air quality standards. Mr. Andrew Herington, an organiser of the submission, said that 1300 tonnes of lead was being dumped around Melbourne each year--with most coming from cars. This could have serious consequences for the health of residents. [Excerpts] [Melbourne THE AGE in English 27 Nov 79 p 14]

SYDNEY AIR POLLUTION--The latest survey by the NSW Pollution Control Commission says 650 tonnes of hydrocarbons are being dumped every day on Sydney. An estimated half of this is caused by exhaust emissions from cars--mainly in the inner city area--and fallout from Sydney's two petrol refineries at Kurnell and Silverwater. The commission calculates vehicles daily spew out 290 tonnes of hydrocarbons, besides 90 tonnes of nitric oxides and 2000 tonnes of carbon monoxide, all contributing to potentially dangerous pollution levels on more than 150 days a year. Its findings support the stand by the NSW Minister for Planning and Environment, Paul Landa, in NSW going it alone in 1981, despite widespread opposition, to implement the controversial third stage of Australia's ADR27A anti-pollution vehicle regulations. [Excerpt] [Canberra THE AUSTRALIAN in English 26 Nov 79 p 7]

PORT PHILLIP BAY POLLUTION--Pollution of Port Phillip Bay by highly toxic PCB chemicals was "a problem but not a bad problem", the Minister for Conservation Mr. Houghton said yesterday. The Government had been aware of it for some time and believed the source of the wastes was historical, he said. Mr. Houghton was replying to a question from the deputy Opposition Leader in the Legislative Council, Mr. Walker, who asked what action would be taken to trace the source of the chemicals. Mr. Houghton said the levels of PCB chemicals found in fatty tissue of fish in Port Phillip Bay were within the standard set by the World Health Organisation. They did not seem to be getting worse but the Government was monitoring them. However, in a statement released later, Mr. Walker said the contamination levels in the bay appeared to be on the increase. PCBs are among the most dangerous and persistent chemicals known to man. It is estimated that 28,000 litres of PCB is stored in Victoria awaiting disposal, while more than 17,000 litres is generated each year. [Excerpts] [Melbourne THE AGE in English 22 Nov 79 p 19]

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COUNCIL TO EVALUATE ENVIRONMENTAL LAWS, COMPLIANCE

Kuala Lumpur BUSINESS TIMES in English 15 Nov 79 p 3

[Text]

THE Environment Quality Council will meet on Dec. 19 to discuss the implementation of the environmental impact assessment policy and evaluate the enforcement of the related legislations.

The National Electricity Board, Malayan Railway, Felda and other statutory bodies are also expected to attend the meeting.

The Director General of Environmental Quality, Mr S. T. Sundram told *Business Times* yesterday the meeting will focus on the efficiency of the various legislations on environmental conservation and look into the compliance of factories to the provisions of the Environmental Quality Act.

So far, he said, only 20 out of the total of 130 palm oil mills have complied. The other mills have until the end of next year to install the required effluent treatment plants.

The serious problem facing the country presently, Mr Sundram said, are the felling of trees, which has far exceeded the pace of reforestation, and indiscriminate mining operations.

A proposed draft National Mining Code will soon be submitted to the National Land Council for discussions before it is tabled in Parliament.

On allegations of "loopholes" in the Environmental Quality Act, Mr Sundram said the division cannot simply suspend the operations of the mills when they do not comply to the act.

Various factors such as the technological and economic position of the mills have to be weighed before deciding whether the mill should be allowed to continue operation.

Referring to the recent temporary suspension of operation of a palm oil mill in Semenyih, Mr Sundram said the licence was restored based on "satisfactory indications" of the mill's environmental conservation standard.

The division, he added, has to be flexible in its enforcement and "it is not possible to go strictly by the book when the concept of environmental conservation is multi-faceted."

He also disclosed that the division will set up eight regional offices in Malaysia under the Fourth Malaysia Plan to facilitate stricter enforcement of the environmental conservation regulations.

The initial phase of the "regionalisation" will involve the establishment of two regional offices in Sabah and Sarawak and six more in various states of Peninsular Malaysia up till 1984.

Enforcement officers will be placed in the respective regional offices to monitor the compliance of the processing industry to the provisions of the environmental act and investigate public complaints of excessive effluent discharge into rivers and indiscriminate solid waste disposal.

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PROFESSOR REPORTS ABUSE OF ENVIRONMENT WORSENING

Manila PHILIPPINES DAILY EXPRESS in English 14 Jan 80 p 1

[Article by Rudy A. Fernandez]

[Text] Los Banos--Various symptoms of environmental overstress have been observed as taking a turn for the worse in many regions.

Such signs suggest destruction of croplands leading to food shortages, drought and the drying up of dam-reservoir systems, and desertification.

This grim scenario can be prevented from happening only if the government and the people correctly read the symptoms and promptly apply the right solutions, according to Dr. Adolfo V. Revilla Jr., a forestry expert.

Professor Revilla, who is with the forestry college faculty of the University of the Philippines at Los Banos, depicted the extent of environmental overstress in the country through a lecture delivered for the SEARCA professorial chair in forest resource management.

SEARCA, which is based in this town, stands for Southeast Asian Regional Center for Graduate Study and Research in Agriculture.

Revilla detailed environmental overstress symptoms in the Philippines as the increasing sediment load of rivers, frequency of destructive floods, decreasing inherent productivity of croplands, crop pests and diseases outbreaks, and lately, occurrence of "mini" dust storms in the Ilocos region.

Revilla said such signs are now found not only in Luzon but also in the Visayas and Mindanao and that these indicate the growing seriousness of ecological deterioration.

The ecological imbalance is directly traceable to failure to adequately maintain the forest cover on the slopes and uplands, he said.

If such failure remains unchecked, Professor Revilla predicted that "many parts of the Philippines would come close to a desert in 200 years."

One remedy he suggested is for the government to reexamine the traditional practice of viewing forest lands as expansion areas for crop production.

"The answer to the food crisis will not be in the clearing of more forests for agricultural purposes," he emphasized. What would help improve agricultural purposes," he emphasized. What would help improve agricultural production in the country is keeping and rehabilitating the forests to protect the watersheds of irrigation projects, implementing agro-forestry projects, developing better crop production technologies and providing more irrigation facilities.

There is a definite limit to land-use conversion from forest to non-forest and that in some cases, he said, the needed conversion is to forest land-use to meet such economic and ecological demands as energy, timber, fiber, soil erosion and flood control, among others.

Revilla pointed out that clearing forest vegetation beyond certain limits, particularly those on the steeper slopes, triggers rapid soil erosion, landslides, river sedimentation, mudflows, floods, droughts, clogging of irrigation systems, siltation of croplands and dam-reservoir systems.

Such results ultimately translate into lower over-all productivity of the ecosystem, he said.

The attitude of some government and private quarters that symptoms of ecological deterioration are "acts of nature" was dismissed by Revilla as misguided thinking.

Such signs and related phenomena are caused by deforestation and land-use conversion activities as well as other forms of abuse of the natural system, he said.

CSO: 5000

POLLUTION PROBLEM IN ZLATNA PANEGA REEXAMINED

Sofia RABOTNICHESKO DELO in Bulgarian 2 Jan 80 p 5

[Article: "Will the Skies Over Zlatna Panega Clear Up?"]

[Text] The big heart of the cement giant has been beating in the Zlatna Panega valley for the past 13 years. Here about 1,300 people from four settlement systems are earning a living. It was for them that 276 apartments, a secondary school for cement production, a culture house, a kindergarten, and a health house were built on the barren meadow in the vicinity of the plant. In the past few years alone employees' wages have risen 32 percent and workers' wages 69 percent.

However, along with the good social gains, clouds of dust pour out of the smokestacks of the five technological lines, covering the environment. They have repelled the young specialists assigned to work here, and increased migration processes away from surrounding settlements. This was a topic of a meeting between a newsman and engineer Georgi Dyulgerov, the plant's director.

The main sources of the dust coming out of a cement plant are the furnaces for roasting the clinker, the raw material mills where the raw flour is ground, and the cement grinding mills, Comrade G. Dyulgerov said.

The dust generated by the first two sources accounts for about 75-80 percent of the total, within which the second accounts for about 20 percent. At the end of 1977 a contract was concluded for the supply of electric filters for the five technological lines with the Schmidt Company in Denmark. The designing of the project was provided by the Zavodproekt Studies and Design Institute in Sofia, while the work was assigned to the Pleven industrial assembly installations. The construction of the new filter tapping systems was undertaken in 1978 and intensified work was carried out in 1979. At this point we can report that the fifth electric filter, commissioned in August, is cleaning gases in such a way that with a dust ratio of 35-45 grams per cubic meter, gases leaving the electric filter now range from 60 to 80 milligrams per cubic meter.

At the beginning of October we commissioned the second electric filter of the fourth technological line and the third was commissioned at the end of the year. The remaining two electric filters will be commissioned in 1980.

Along with the installation of the new dust tapping systems we have made great efforts to train the people. The equipment at our disposal has proved its stability and reliability. Behind this, however, are the people who must follow a normal technological system. In the preparatory period we sent 15 of our specialists to spend 15 days in Poland; seven others were sent to the GDR to specialize. At the same time, we are training the plant's personnel, for the normal operation of an electric filter, for example, is determined by the "workplace complex," and "workers complex," which must carry out their obligations conscientiously, responsibly, and concernedly. Only thus could we expect the normal work of the dust tapping equipment.

We definitely believe that the training of the people, along with self-control and self-exactingness on the part of everyone will ensure the normal work and reliability of the dust tapping equipment.

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AIR POLLUTION PROBLEMS ANALYZED IN TECHNICAL REPORT

Havana REVISTA CUBANA DE HIGIENE Y EPIDEMIOLOGIA in Spanish Jan-Apr 79 pp 3-16

[Report by C.F. Martinez Rodriguez and R. Carreno de Celis, members of the National Directorate of Environmental Hygiene, Ministry of Public Health: "Air Pollution in Cuba"]

[Text] Summary. The major problems resulting from air pollution in Cuba and the course of the continuous surveillance program during 1970-1976 are presented in this paper. The situations which led to the current problems, the main pollution sources in the country and the beginning of the program activities in 1969 are exposed. The program involves 16 communities with a population of 2,848,500 inhabitants (33 percent of the whole country population and 55 percent of the urban population) and a total of 46 stations will be distributed in all provinces on the basis of an election of urban nuclei according to their current and prospective development characteristics. These are fixed stations and they develop daily studies on suspended sulfur dioxide and dust concentrations and monthly studies on sedimentable dust concentration, corrosion rate and sulfuration rate. Up to date, 16 stations of the national network have been built; furthermore, 203 fixed sampling posts have been built in 50 places where sedimentable dust, corrosion rate and sulfuration rate are determined. Results obtained by the national sampling network regarding the different studied pollutants are analyzed and the main conclusions are: air pollution is not a country problem but in some areas of the Havana City; the surveillance program must be pursued in order to know the phenomenon characteristics according to the country's socioeconomic development; and the obtained data are used in controlling the problem through urban and regional planning. Finally, the program prospectives in respect to the development of several activities which lead to a better preventive and control work are pointed out.

Introduction

This paper discusses the principal air pollution problems in Cuba and evaluates the Continuous Surveillance Program over the period 1970-1976.

The Air Pollution Surveillance Program is carried out by the Ministry of Public Health through the National Health System and comprises the following basic activities:

--investigation of the principal sources of pollutant emissions in cities and industrialized regions;

--measurement of pollutant concentrations in the atmosphere, through the nationwide network of continuous surveillance stations;

--evaluation of results and use of the data thus obtained to establish contol measures.

Background

There are no records of any air pollution problems having existed in Cuba until on two occasions, in September 1961 and 1963, temperature inversion phenomena in Havana supposedly gave rise to serious outbreaks of respiratory syndromes that brought an excessive number of patients to the emergency rooms of various hospitals located in the most affected zone of the city and for which no other explanation could be found.

Problem areas also exist outside of Havana, in certain cities and rural areas of the country, but they are of lesser magnitude.

Present problems date back to conditions that existed during the prerevolutionary period, among which may be cited:

1. Lack of understanding of the problem and a total lack of interest on the part of the governments.

2. The nonexistence, as a consequence of the above, of any allocations of funds, or of any effort to develop technical cadres capable of evaluating and controlling the situation.

3. Lack of any governmental bodies responsible for physical urban and rural planning, with the result that cities developed anarchically and grew without reference to any "master" or "comprehensive" plan. This process was accompanied by large-scale speculation in urban real estate and by the siting of environmental pollutant industrial installations in residential areas.

4. The existance of inoperative and archaic public health legislation that had no technical basis and that was frequently violated to benefit private economic interests.

As in other countries, the main sources of air pollution in Cuba are industries, urban transportation, and in some cities the system of final disposal of solid wastes.

Work concerning air pollution began in 1969 with the creation of a technical commission made up of representatives of various government bodies. This commission was assigned the task of initiating studies on the air pollution problem in Havana.

The initial work of this commission consisted of studying the main sources of air pollution in the city and compiling meteorological data, with the object of gaining an initial conception of the magnitude of the problem.

Subsequently, technical assistance was requested of the Pan-American Health Organization, Regional Office of the WHO, in the form of experts and funds for the installation of sampling stations.

In 1970, the country joined the Pan-American Air Pollution Sampling Network and a program was drawn up for establishing a nationwide surveillance network.

Program Scope

The Air Pollution Continuous Surveillance Program involves 16 communities with a total population of 2,848,500 inhabitants, amounting to 33 percent of the country's total population and 55 percent of its urban population (according to the 1970 census), in which a total of 46 stations will be installed, distributed, by provinces, as follows: 2 in Pinar del Rio; 12 in Havana (City); 3 in Matanzas, 4 in Villa Clara; 3 in Cienfuegos; 4 in Camaguey; 14 in Holguin; and 4 in Santiago de Cuba.

The communities to be studied were chosen in accordance with three sets of criteria:

a) Communities under current or planned future industrial development, some of which have existing air pollution problems. Included in this category are: Havana, Matanzas, Cienfuegos, Sagua la Grande, Nuevitas, Holguin and Santiago de Cuba.

b) Communities that are capitals of provinces with large population and social installation growths, and with some industrial growth. Included in this category are: Pinar del Rio, Santa Clara and Camaguey.

c) Mining and industrial regions like Santa Lucia in the province of Pinar del Rio, and the Nicaro-Moa mining region in northern Holguin.

The stations are fixed and have been sited in accordance with the master urban and rural plans and in relation to zones under current and planned future residential, commercial and industrial growths, selected with the object of gathering information that is representative of the situation.[1]

The stations that comprise the National Surveillance Network carry out daily studies of sulfur dioxide (SO_2) and suspended dust concentrations. and monthly studies of settleable dust concentrations and of corrosion and sulfurization indexes. One station in Havana measures hydrogen sulfide (H_2S) and nitrogen dioxide (NO_2) concentrations, and another station in the same city measures only the H_2S concentration.

Radioactive fallout in the atmosphere has been studied since 1972 at a station located in the National Institute of Oncology and Radiology in Havana, through measurements of strontium-90.

In addition to the surveillance stations, fixed sampling points have been installed to measure one or more of the following pollutants: settleable dust, corrosion index and sulfurization index.

These points are located in 50 localities throughout the country.

The samplings are analyzed by the National Hygiene and Epidemiology Laboratories Network.

Sampling and Analysis Methods

Following is a discussion of the sampling and analysis methods used in the study of each of the pollutants:[2]

a) Suspended Dust

By means of a system consisting of a pump and a volume meter, air is forced through a sheet of filter paper during a 24-hour period.

The loss in reflectivity of the filter paper is then measured by photoelectric means. The suspended-dust concentration is expressed in micrograms per cubic meter and a characteristic curve is drawn.

b) Sulfur Dioxide

The configuration used in the above method is supplemented by a washing bottle for gases. After passing through the filter paper, the air is bubbled through a solution of hydrogen peroxide which retains the sulfur dioxide and oxidizes it to sulfuric acid. A second washer bottle contains silica gel to absorb the moisture and protect the volume meter and the motor. The acidity increase is determined volumetrically and the atmospheric concentration is calculated in micrograms per cubic meter.

c) Nitrogen Dioxide and Hydrogen Sulfide

To measure these pollutants, a washing bottle and volume meter are added to the above system. An absorbtion solution for each pollutant is poured into the bottle. The Saltzman colorimetric method is used to measure the nitrogen dioxide, and the silver sulfide colorimetric method is used for the hydrogen sulfide. The concentrations are calculated and expressed in mulligrams per cubic meter.

ch) Settleable Dust

A cylindrical plastic bottle is exposed to the air for a period of 1 month. At the end of this sampling period, the bottle is taken to the laboratory and the collected dust removed from it, dried and weighed.

The results are expressed in milligrams per square centimeter per 30 days.

d) Corrosion Index

Two standard, stainless steel disks, 70 mm in diameter, are exposed to the air in a cabin for a period of 30 days. Their average increase in weight owing to corrosion is measured and the results expressed in milligrams per square centimeter per 30 days.

e) Sulfurization Index

A lead dioxide lamp is exposed to the air for a period of 1 month. The amount of sulfate is determined by means of a spectrophotometric reading and a curve that has been worked out. The result is expressed in milligrams per square decimeter per day.

f) Strontium-90 in Radioactive Fallout

The technique approved by the IEO [International Energy Organization]. The results are expressed in millicuries per square kilometer.

Air Quality Standards

For many years in our country, quality standards did not exist.

With the triumph of the Revolution, work began on drawing up the Public Health Code of the Republic of Cuba, which is now in its promulgation phase and which lays down the maximum acceptable concentrations of air pollutants.

Table 1 lists the pollutant concentration standards used by the National Surveillance Network.

Table 1

Pollutant	Maximum permissible concentration	
Sulfur dioxide	70	mcg/m^3/day
Suspended dust	100	mcg/m^3/day
Settleable dust	0.5	mg/cm^2/30 days
Nitrogen dioxide	0.085	mg/m^3/instantaneous sample and per day
Hydrogen sulfide	0.008	mg/m^3/instantaneous sample and per day

There are no current standards for corrosion and sulfurization. They are being studied only in terms of measured concentration trends

The Code lays down standards for other pollutants as well, which, however, are not being measured currently by the national network (see Annex).[3]

Current Situation

From March 1970 to December 1976, the Air Pollution Surveillance Network grew year by year. It now comprises 16 stations and 203 fixed sampling points. Table 2 and its accompanying map show the distribution and locations of these stations.

In some of the cities where surveillance stations are operating, meteorological data has been furnished by the Meteorological Institute of the Academy of Sciences of Cuba.

In the larger cities, the major sources of pollution have been identified. It has not been possible, however, to determine precisely the contribution of each to the pollution of the urban atmosphere.

The information developed by the network has facilitated control action to track down new industrial and other installations that constitute sources of air pollution.

This information has also been used to develop some of the layouts in master urban plans. It is regularly circulated to the following governmental bodies: Physical Planning Institute; Meteorological Institute;

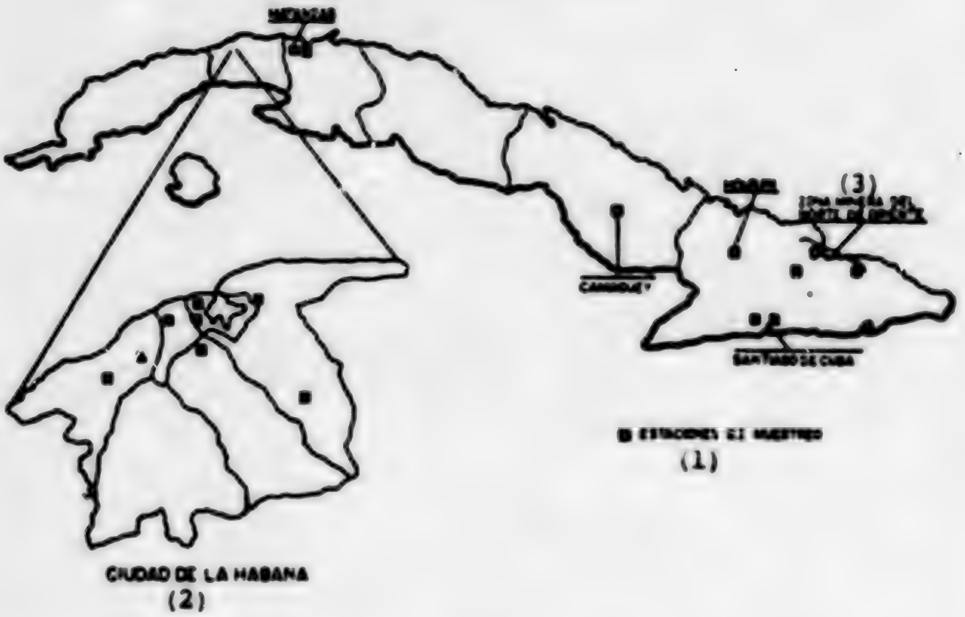
TABLE 2

Distribution, by provinces, of stations and fixed sampling points in the Continuous Air Pollution Surveillance Network, as of December 1976:

Province or municipality	Stations	Fixed sampling points*
Pinar del Rio	-	--
Havana (city)	8	23
Province of Havana	-	17
Matanzas	2	17
Cienfuegos	-	10
Villa Clara	-	25
Sancti Spiritus	-	15
Ciego de Avila	-	9
Camaguey	1	27
Granma	-	14
Las Tunas	-	1
Holguin	3	14
Santiago de Cuba	2	12
Guantanamo	-	15
Isla de Pinos municipality	-	4
Total	16	203

* These measure one or more of the following pollutants: settleable dust, sulfurization index, and corrosion index.

[Accompanying map on following page]



Air pollution sampling station network. Cuba/1970-1976

Key:

1. Sampling stations
2. Havana (city)
3. Northern Oriente mining zone

[Map accompanying Chart 2]

Ministry of Communications; Ministry of Electric Power Industry; and Central Planning Board.

Measured Pollutant Concentrations

The following is a report on the concentration levels of the different air pollutants, according to the results obtained by the National Surveillance Network throughout the country.

Sulfur Dioxide

During the period being evaluated, 13,337 samples were collected and processed in the existing stations.

The average daily concentrations of this pollutant exceeded the maximum permissible values only at the stations in the vicinity of Havana and, inside the city, at Havana Station 1 located at the edge of the city's oldest zone, which also contains the city's main sources of pollution. At this station, the average daily concentrations of this pollutant exceeded the maximum permissible level in 43-50 percent of the samples collected between 1970 and 1972. Between 1973 and 1975, this figure rose to 62-72 percent of the samples taken, and in 1976 it dropped to 42 percent.

An analysis of the average monthly concentrations at this same station shows that the heaviest atmospheric concentrations of sulfur dioxide during this period were experienced between August 1972 and May 1974. We wish to point out that during some days in the latter period concentrations reached over eight times the permissible level.

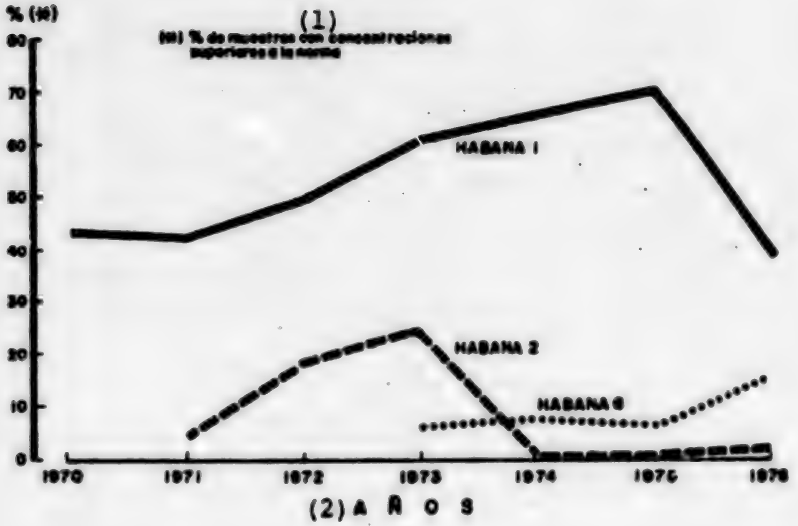
The second highest average daily concentrations of sulfur dioxide were recorded at Havana Station 2 located near an industrial zone. However, the magnitude of the problem at this station is of a much lower order than at Havana 1, in that it reaches sizeable proportions only during 1972 and 1973 when sulfur dioxide concentrations exceeded the permissible limit in 19 and 25 percent of the samplings taken, respectively.

At Havana Station 6, an increase was recorded in the sulfur dioxide concentration during 1976 (Graph 1).

Suspended Dust

Havana Station 2 recorded the highest average monthly concentrations, having exceeded the permissible limit every month; however, beginning in 1974 average monthly concentrations at this station dropped every month to half the permissible limit.

Average monthly concentrations at Havana Station 1 exceeded the standard until 1975; but since that year a substantial drop in concentration levels is observable.



Graph 1 - Average daily concentrations of SO_2 as measured by the National Air Pollution Sampling Network during the period 1970-1976.

Key:

1. Percent of samplings with concentrations exceeding the permissible maximums
2. Year

At the other Havana stations and those of the other cities throughout the network, the average monthly concentrations have remained well below the permissible level.

With respect to average daily concentrations, a similar phenomenon is observable. At Havana Station 2, from 1971 to 1973, permissible levels were exceeded on 80 percent of the days; from 1974 to 1976, they were exceeded on only 10 percent of the days.

At Havana Station 1, the average daily concentrations from 1970 to 1974 exceeded the limit on 41-66 percent of the days of each year, dropping in 1975 and 1976 to exceed the limit only 13 and 3.5 percent of the days, respectively.

In the other Havana stations, average daily concentrations exceeded the maximum permissible on less than 15 percent of the days.

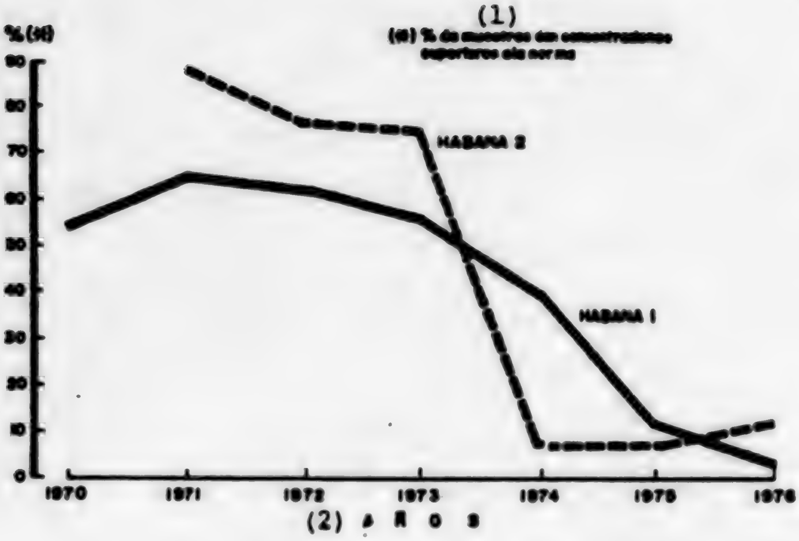
The stations in the other cities throughout the country all registered daily average concentrations below the maximum permissible throughout the period being evaluated (Graph 2).

Settleable Dust

At the 203 fixed sampling points, 3,315 settleable dust samplings were analyzed. This pollutant is present in highly variable concentrations in our cities, having their origin in natural as well as artificial sources. The first of these two types of sources characterizes many of our communities, above all, the small nuclei located in rural zones surrounded by unpaved roads. The second type includes dust-producing sources located close to or within urban nuclei, such as: cement plants, stone quarries, mining and construction materials industries, construction projects, and so forth.

In Havana, the zones having the heaviest concentrations are those corresponding to the Havana 1, Havana 4 and Havana 11 stations, the latter two being those of the port zone and the metalworking industrial development zone respectively. In these, the settleable dust concentrations during the 1970-1976 period exceeded the permissible limits in 80-90 percent of the months of each year.

Other cities with high levels of this pollutant are: Sancti Spiritus with 80 percent of the samplings above maximum permissible, and the northern Oriente mining zone, above all, the Nicaro and Moa communities, where concentrations exceed limits in 100 percent of the months. Corrective measures have been initiated in the idustries in this mining region to reduce dust emissions.



Graph 2 - Average daily concentrations of suspended dust as measured by the National Air Pollution Sampling Network during the period 1970-1976.

Key:

1. Percent of samplings with concentrations exceeding the permissible maximums
2. Year

Corrosion

A total of 371 samplings have been taken and analyzed to determine the atmospheric corrosion index. It has not been possible to establish trends inasmuch as all data is for the year 1976, except in the case of the two Santiago de Cuba stations, wherein the data cover 2 and 3 years and show no rising trend in the corrosion index values.

Analysis of all the data obtained throughout the country shows the corrosion index to be within the range of 0.10-1.00 mg/cm^2/30 days in 50 percent of the samplings processed. Approximately 5 percent of the samplings, almost all of them from the city of Havana, show high corrosion indexes in the range of 6.00-9.00 mg/cm^2/30 days (Graph 3).

Sulfurization

Samplings taken and processed to determine this index totaled 667, all from the city of Havana.

Statistical analysis of the results shows 72 percent of the samplings yielding sulfurization indexes in the range of 0.1-1.00 $mg/decimeter^2$/per day.

Values exceed this range in 10 percent of the samplings, all from the zones that also register high corrosion indexes. No rising trend in the sulfurization index is observable during the period analyzed.

Values obtained for the rest of the country are too few to enable the drawing of conclusions.

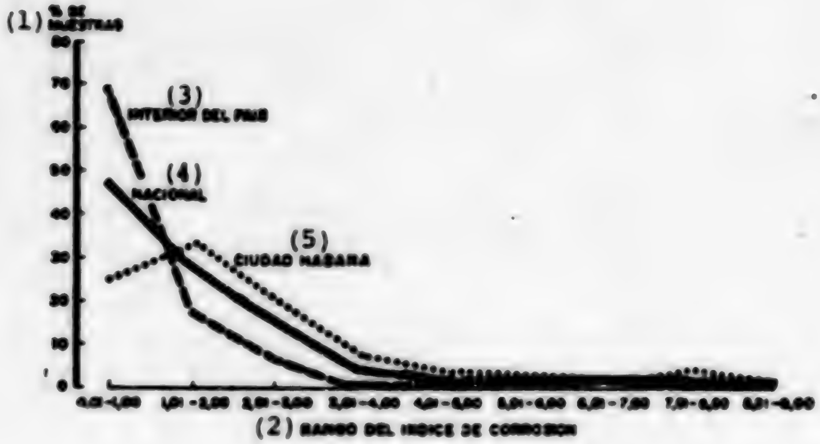
Nitrogen Dioxide

Nitrogen dioxide samplings taken and processed totaled 509, all corresponding to Havana Station 1. Average monthly concentrations of this pollutant during the 1970-1976 period were well below the maximum permissible limit; 1976 shows a slight reduction in concentration levels.

Analysis reveals daily average concentrations close to or slightly exceeding permissible limits during some days in October and November 1973; February 1974; and January, March and April 1975. The heaviest concentration recorded for the entire period occurred on 1 day in November 1974: 0.158 mg/m^3.

Hydrogen Sulfide

Hydrogen sulfide samplings processed totaled 488, all corresponding to Havana Station 1. Average monthly concentrations exceeded limits only during September and October 1972; November and December 1973; and August 1974. However, average daily concentrations exceeded permissible limits



Graph 3 - Corrosion index as measured by the National Air Pollution Sampling Network in 1976.

Key:

1. Percentage of samplings
2. Corrosion index range
3. Interior of country
4. Nationwide
5. Havana (city)

on days in every month of the period evaluated, and the highest value for the period was obtained in August 1974 ($0.055\ mg/m^3$), which was seven times the standard.

Conclusions

1. The Continuous Air Pollution Surveillance Program has developed satisfactorily during the 1970-1976 period and especially during the last 3 years in which the sampling network has been extended to cover the country's principal cities.

2. Based on the data supplied by the sampling stations and posts, it has been possible to gain a general conception of the magnitude of the problem throughout the country and of the training that must be given to the personnel of our organization in the techniques and the methods of evaluation and control of air pollution.

3. The information that has been acquired has been used basically to establish hygienic constraints on the exact siting of new industrial, social, commercial and other installations, and to advise government bodies responsible for planning, production, construction and services.

4. As of now, the city of Havana is the problem area with respect to air pollution. and, within this area, the most affected zones are the older sections of the city, where the effects of pollution add to those of a deficient urbanization.

5. Although air pollution does not, as of now, present a problem throughout the rest of the country, the surveillance program must be continued so that the development of our knowledge of the characteristics of the phenomenon can keep pace with the growth of urban nuclei around new industrial installations, growths in population and transit, and the incorporation of new pollution-producing sources.

The Course Ahead

Although the Continuous Air Pollution Surveillance Program has accomplished its goals to date, a number of steps must be undertaken to improve prevention and control. These steps can be summarized as follows:

1. Establishment of improved sampling systems, especially in Havana, to enable instantaneous atmospheric concentration determinations.

2. Measurement of specific pollutants in zones where installations exist that emit them. This is necessary in industrial zones where we know that pollutants are being produced that are not detected by the present stations.

3. Investigate the meteorological and topographic factors that affect the air pollution problem, inasmuch as the information obtained to date is insufficient to establish the relationships among the various factors.

4. Better equipment in our control laboratories and introduction of more precise analytic techniques.

5. Implement epidemiology in zones with pollution problems, to know the impact of the latter on the health of the population.

6. Establish the use of computerized and advanced statistical methods for processing the data collected by the network to satisfactorily evaluate existing problems and develop adequate forecasts.

7. Raise the technical and scientific proficiency levels of the personnel working in the program, through counseling by experts, through study courses and brief fellowships, and through documentation and information on air pollution control techniques.

ANNEX

Maximum permissible concentrations of other pollutants in open air in residential zones

Pollutant	Maximum permissible limit (mg/m^3)	
	Instantaneous sample	Average over 24 hours
Nitric acid:		
--as HNO_3	0.4	0.4
--as hydrogen ion	0.006	0.006
Acrolein	0.03	0.03
Alpha methyl styrene	0.04	0.04
Alpha napthoquinone	0.005	0.005
Amyl acetate	0.10	0.10
Amylene	1.5	1.5
Ammonia	0.2	0.2
Aniline	0.05	0.03

Pollutant	Maximum permissible limit (mg/m^3)	
	Instantaneous sample	Average over 24 hours
Acetaldehyde	0.01	--
Acetone	0.35	0.35
Acetophenone	0.003	0.003
Butanol	0.1	--
Isopropyl alcohol	0.6	--
Caproic acid	0.01	0.005
Maleic anhydride (vapors, aerosols)	0.2	0.05
Arsenic (inorganic compounds, except arsenical hydrogen which is calculated as As)	--	0.003
Propyl alcohol	0.3	--
Sulfuric acid		
--as H_2SO_4 molecule	0.3	0.1
--as hydrogen ion	0.006	0.002
Acetic acid	0.2	0.06
Butyric acid	0.015	0.01
Acetic anhydride	0.1	0.03
Phthalic acid (aerosol vapors)	0.1	0.1
Benzene	1.5	0.8
Petroleum benzin (with low sulfur content) (calculated as C)	5.0	1.5
Butane	200.0	--
Butyl acetate	0.10	0.10
Butylene	3.0	3.0
Carbon disulfide	0.03	0.01
Caprolactam (aerosol vapors)	0.06	0.06
Malathion	0.015	--

Pollutant	Maximum permissible limit (mg/m^3) Instantaneous sample	Maximum permissible limit (mg/m^3) Average over 24 hours
Fluoride compounds (calculated as F):		
--gaseous compounds (HF, SiF_4)	0.02	0.005
--very soluble inorganic fluorides (NaF, Na_2SiF_6)	0.03	0.01
--slightly soluble inorganic fluorides (AlF_3, Na_3AlF_6, CaF_2)	0.2	0.03
--in combination with gaseous fluorine and fluorine salts	0.03	0.01
Chlorine	0.10	0.03
Chlorobenzene	0.10	0.10
Chloroprene	0.10	0.10
Phosphorus pentachloride (Dipterex)	0.04	0.02
Hexavalent chromium (calculated as CrO_3)	0.0015	0.0015
Cyclohexane	1.4	1.4
Cyclohexanol	0.06	0.06
Cyclohexanone	0.04	0.04
Nitrogen dioxide	0.085	0.085
Divinyl	3.0	1.0
Diacetone	0.007	--
Dimethylaniline	0.0055	0.0055
Methyl sulfide	0.08	--
Dimethyl bisulfide	0.7	--
Dimethyl formamide	0.03	0.03
Dichloroethane	3.0	1.0
Dichlone	0.05	0.05
Diethylamine	0.05	0.05
Styrene	0.003	0.003

	Maximum permissible limit (mg/m^3)	
	Instantaneous sample	Average over 24 hours
Epichlorohydrin	0.2	0.2
Ethanol	5.0	5.0
Ethyl acetate	0.1	0.1
Ethyl benzene	0.02	0.02
Ethylene	3.0	3.0
Phenol	0.01	0.01
Formaldehyde	0.035	0.035
Furfural	0.05	0.05
Hexamethylenediamine	0.001	0.001
Cumene hydroperoxide	0.007	0.007
Para-chlorophenyl isocyanate	0.0015	0.0015
Cumene	0.014	0.014
Intrathion (M-81)	0.001	0.001
Manganese and its compounds (calculated as MnO_2)	—	0.01
Methanol	1.0	0.5
Methyl parathion	0.008	—
Meta-chlorophenyl isocyanate	0.005	0.005
Methyl acrylate	0.01	0.01
Methyl acetate	0.07	0.07
Methyl mercaptan	9×10^{-6}	—
Methyl methacrylate	0.1	0.1
Monomethylaniline	0.04	0.04
Monoethylamine	0.01	0.01
Metallic mercury	—	0.0003
Carbon monoxide	3.0	1.0

	Maximum permissible limit (mg/m^3)	
	Instantaneous sample	Average over 24 hours
Nitrobenzene	0.008	0.008
Naphthalene	0.003	0.003
Ethylene oxide	0.3	0.03
Vanadium pentoxide	--	0.002
Pentane	100.0	25.0
Para-chloranil	0.04	0.01
Pyridine	0.08	0.08
Propylene	3.0	3.0
Lead and its compounds (except lead "teralito" calculated as Pb)	--	0.0007
Phosphoric anhydride	0.15	0.05
Lead sulfide	--	0.0017
Hydrogen sulfide	0.008	0.008
Tetrahydrofuran	0.2	0.2
Thiophene	0.6	0.6
Toluene	0.6	0.6
Trichloroethylene	4.0	1.0
Carbon tetrachloride	4.0	2.0
Vinyl acetate	0.2	0.2
Xylene	0.2	0.2

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CSO: 5000

LOCAL POLLUTION PROBLEMS SELDOM HEEDED

Manama GULF MIRROR in English 22-28 Dec 79 p 1

[Text]

GULF industries are becoming an increasing health hazard, a Bahraini minister warned this week. As oil producing countries in the area industrialise, pollution-related diseases are on the increase.

Health Minister Dr Ali Fakhro told a meeting of doctors and engineers that refineries, aluminium plants and shiyards were damaging the environment, increasing mercury and lead levels, destroying fishing grounds and causing illness.

Mercury levels in the Gulf were rising, he said, and from now on must be carefully monitored. Recent surveys of fish have revealed traces of mercury and lead poison "enough to cause concern."

As examples of industrial pollution in the Gulf, Dr Fakhro said that trees and plants were dying around the Alba complex from the emission of hydrogen fluorides, and that medical experts were looking for a connection between local cases of silicosis and stone crushing plants.

The Asry ship repair yard had contributed to the destruction of shrimp fishing grounds during construction and was now adding to lead pollution levels, he said.

Scientists have determined that the maximum safe output for an aluminium plant is 200,000 tons a year, he said. "We are already producing at Alba 120,000 tons a year, and with the expansion it will soon be 160,000 tons — near to the upper limit."

Dr Fakhro criticised local attitudes to environmental pollution. "In Bahrain we must admit that we have been slow to deal with the problems. We don't make enough noise," he said.

CSO: 5000

NAMIBIA

DROUGHT SAID POSSIBLE BY FEBRUARY

Windhoek THE WINDHOEK ADVERTISER in English 18 Jan 80 p 6

[Text] SOUTH West Africa could be facing a drought situation comparable to the drought which scourged SWA in 1964, if no rains fall by the middle of February.

This was the opinion of Mr Henning Snyman, Secretary of the SWA Agriculture Union. Mr Snyman was speaking after a meeting of the Union's Executive earlier this week when proposals on possible emergency measures in aid of the Territory's drought stricken farmers were tabled.

The proposals are destined to be put to the Director of the Directorate of Agriculture and Forestry Mr Louis Mostert.

Mr Snyman said that a decision was taken at the meeting to set a target date for the middle of February. If the rains have not come by then, emergency measures will have to be instituted. As far as the Union is concerned, the measures should be centred on the preservation of the farmers' flocks.

The Executive felt that the existing aid for drought-stricken farmers, which consists of a 75 percent rebate on the railege of all fodder and applicable to all farmers, was not adequate in the present situation. Aid on a larger scale was necessary.

The regions that are affected the most to date are the western part of the Outjo district, the north-west area of Omaruru, the western part of Karibib/Usakos, the Maltahöhe area, the western portion of Bethanie and the southern area of Warmbad.

He had personally done an inspection in parts of the Outjo district, Mr Snyman said and had reported back to the Executive that if there were no rains by the middle of February, it would be the fourth successive year that this area had a below average rainfall.

A number of decisions were taken at the metting, amongst other that:

● the various regional agricultural unions and farmers' associations be requested to take the initial steps to have their areas declared emergency grazing areas. A certain procedure had to be followed which took time. If the initial spadework was done now the emergency measures could be put into gear immediately when necessary.

● the Commission of Inquiry into the population density be requested immediately to give urgent attention to this aspect, because it had direct bearing on the Commission's task.

● the Directorate of Agriculture and Forestry be requested to start the necessary preparations to give aid to farmers by the middle of next month.

CSO: 5000

WEST BUDAMA COUNTY HIT BY DROUGHT; ONLY TEA, SUGAR AVAILABLE

Kampala UGANDA TIMES in English 5 Jan 80 p 1

[Article by John Owino: "Families in Famine Appeal"]

[Excerpt] Many families are threatened with starvation in West Budama county, Tororo District, following one of the longest droughts in 10 years.

In three meetings held recently between the people of the county and two officials from the UNLF secretariat, Mr Odoi and Mr John Owino, at Nagongera [?] and Kirewa sub-counties, the people appealed to the government to come to their rescue.

One farmer said: "What is keeping us alive is tea because there is sugar in the shops. We drink tea and sleep.

"Even if we have money there is no food to buy", he added. The county depends on millet, cassava and sweet potatoes. But over the last six months bad weather has dried up most of the crops.

During a recent visit by the NCC secretary, Mr Omwony Ojwok, and five NCC members to the county, famine featured prominently in several meetings they held with the people.

Omwony Ojwok had told the people that arrangements were underway to buy cassava from Kumi District and sell it to the people in the affected areas at subsidised prices.

CSO: 5000

DRAFT RESOLUTION ON AIR POLLUTION CONTROL

Baku VYSHKA in Russian 23 Dec 79 p 3

/Article: "A law of the Union of Soviet Socialist Republics Concerning Air Quality Preservation"/

/Text/ Air is one of the basic vitally important elements of the natural environment.

The Soviet government attaches great importance to the preservation, restoration and improvement of the condition of the air in order to ensure the best conditions of life for the Soviet peoples during their work, daily life, rest and health and for further development of economic production and culture and also in order to prevent environmental deterioration.

The scientific and technical revolution, affecting every aspect of life of society, high rates of industrial development, the growth of cities, the increasing use of the atmosphere and the increasing scales of the effect of man on the natural environment require increased attention to preservation of the air quality.

In conformity with the Constitution of the USSR and the interests of present and future generations, necessary measures are being taken in the USSR for preservation of air quality and for improvement of man's environment. In order to achieve these goals, the Soviet state is carrying out a combination of scientific and technical, economic, social and other measures to ensure prevention and elimination of air pollution and other harmful effects upon it.

Soviet legislation concerning air pollution control, being a part of legislation concerning environmental protection, calls for active steps in preserving the purity and improving the air quality and also calls for prevention of harmful effects upon it.

I GENERAL PROPOSITIONS

Article 1. Objectives of Soviet Legislation Concerning Preservation of Air Quality

Objectives of Soviet legislation concerning air quality preservation include the regulation of public activities for purposes of protecting air quality, prevention and reduction of atmospheric pollution and other harmful effects on it from chemical, physical and biological factors, which cause changes of air quality which are harmful to man and to the animal and plant worlds and the national economy and also protection of the rights of socialist organizations and citizens and the reinforcement of law concerning air quality preservation.

Article 2. Legislation of the USSR and the Union Republics Concerning Air Quality Control

Legislation of the USSR and the union republics concerning air quality preservation consists of this law and other legislative acts of the USSR and laws and other legislative acts of union republics concerning air quality preservation issued in conformity with this present law.

Article 3. Competence of the USSR in the Area of Regulating Activities Concerning Preservation of Air Quality

The competence of the USSR in the area of regulating activities for the purpose of maintaining air quality involves:

1) determination of general measures and establishment of basic propositions in the area of air quality protection;

2) establishment of standards of maximum permissible levels of pollutants in the air and standard methods of determining the levels of these substances;

3) establishment of methods of calculating standards of maximum permissible emissions of pollutants into the air by sources of pollution;

4) establishment of standards of maximum permissible levels of emissions of pollution into the atmosphere for automobiles, airplanes, other means of transportation and also self-propelled equipment and devices;

5) establishment of standards of maximum permissible harmful effects on the atmosphere from physical factors and also other factors;

6) development and ratification of All-Union plans for air pollution control, constituting part of government plans of economic and social development of the USSR;

7) government control of air pollution control and establishment of the procedure for its realization;

8) solution of other problems of All-Union significance in the area of air pollution control in conformity with the Constitution of the USSR and the present law.

Article 4. Competence of Union Republics in the Area of Regulating Activities Concerning Air Pollution Control

The activity of union republics in the region of regulating activities concerning air pollution control outside the limits of competence of the USSR pertains to: establishment of a procedure for air pollution control; confirmation of republican plans for air pollution control which are part of the government plans of economic and social development of the union republic; realization of government supervision of air pollution control and also regulation of other problems in the area of air pollution control if they are not included in the competence of the USSR.

Article 5. Government Control in the Air of Air Pollution Control

Government management in the area of air pollution control is implemented by the USSR Council of Ministers, by Councils of Ministers of union republics, by Councils of Ministers of autonomous republics, by executive committees of Soviets of People's Deputies and also by special agencies authorized for this by the government in conformity with legislation of the USSR and union republics.

Within the limits of their authority, local Soviets of People's Deputies coordinate and control the activity of enterprises, institutions and organizations of superior subordinations in the area of air pollution control, situated in their territory.

Article 6. Participation of Public Organizations and Citizens in the Administration of Affairs Associated With Air Pollution Control and in the Realization of Measures in this Region

Trade unions, youth organizations, nature protection societies, scientific societies and other public organizations will participate in the administration of matters associated with air pollution control and will cooperate with government agencies in realizing it; they will help to involve the broad masses of the people in active and direct participation in air pollution control, will conduct propaganda of Soviet legislation on problems of air pollution control. Public organizations will take part in activities directed toward the ensurance of air pollution control in accordance with the Constitution of the USSR, legislation of the USSR and union republics and their regulations (propositions).

According to the Constitution of the USSR, the USSR citizenry is obligated to maintain air pollution control. They also have the right to participate in administration of affairs associated with air pollution control.

State agencies are obligated to consider in every possible way the suggestions of public organizations and citizens for realization of air pollution control measures.

II MEASURES OF AIR POLLUTION CONTROL

Article 7. Planning Measures for Air Pollution Control

Air pollution control measures for the prevention and elimination of its causes and other harmful effects on the atmosphere and other measures for improving air quality are provided for in government plans of economic and social development and are realized by appropriate ministries, state committees and departments, enterprises, institutions and organizations.

The planning of air pollution control measures is to be conducted with consideration of short-term and long-term forecasts of its state.

Air pollution control measures, provided for by ministries, state committees and departments, enterprises, institutions and organizations are subject to coordination with agencies which are carrying out state supervision of air pollution control in the order established by legislation of the USSR and the union republics.

Article 8. Standards of Maximum Permissible Harmful Effects on Air Quality by Chemical, Physical and Biological Factors

In order to protect air quality from the harmful effects of chemical, physical and biological factors, which worsen its quality for the people, plant and animal worlds and also for the national economy, there are to be established: standards of maximum permissible levels of pollutants in the air; methods of calculating the standards of maximum permissible emission of pollutants into the atmosphere by pollution sources; standards of maximum permissible levels of emissions of pollutants into the air, including maximum permissible norms of levels of harmful substances in exhausts from automobiles, airplanes and other means of transportation and automotive vehicles; and standards of maximum permissible levels of harmful effects on air quality of physical and other factors.

Rules of the development, confirmation and introduction into effect of standards of maximum permissible harmful effects on air quality of chemical, physical and biological factors (including methods of their determination) and also methods of calculation of standards of maximum permissible pollutants emissions are to be confirmed in an order established by the USSR Council of Ministers.

The harmful effect on air quality of chemical, physical and biological factors for which appropriate standards are not established may be permitted only in exceptional cases according to authorizations issued for a specific period by specially authorized state air pollution supervisory agencies. Within the authorized period standards of permissible effect on air quality of the factor in question should be established.

Article 9. Maximum Permissible Levels of Pollutants in the Atmosphere

In order to evaluate and regulate air quality there are to be established obligatory standards of maximum permissible levels of pollutants in the atmosphere.

These standards must protect the health of the people, prevent harm to the environment and to the national economy.

Article 10. Maximum Permissible Levels of Air Pollution From Sources of Pollution

There are established maximum permissible levels of pollutant emissions into the air for pollution sources, that is, maximum quantities of pollutants emitted per unit of time.

Maximum permissible levels of pollutants emissions by pollution sources should be established at a level which does not exceed the maximum permissible levels of pollutants in the air and which does not exceed the level dangerous to human health, the natural environment and the national economy.

Kinds of sources of air pollution for each of which are established maximum permissible emissions of pollutants into the air are to be determined in a procedure established by the USSR Council of Ministers.

Article 11. Regulation of Emissions Into the Air by Stationary Sources of Pollution and Prevention and Elimination of the Harmful Effect on the Atmosphere of These Emissions

Enterprises, institutions and organizations whose activities are associated with pollutants emissions into the air, regardless of the time of erection of the pollution sources must be equipped with pollution control installations, equipment and apparatus and must ensure uninterrupted, effective operation and maintenance in working order of these installations, equipment and apparatus and also carry out systematic calculation of the quantity of pollutants emitted into the air and their composition.

Ministries, state committees and departments are obliged to supervise the design, construction and operation of installations, equipment and apparatus for purifying air pollutants and equip them with devices necessary for constant monitoring of the effectiveness of purification.

Emission of pollutants into the atmosphere by stationary sources of pollution are permissible on the basis of licenses issued by state agencies specially authorized for this purpose.

The procedure for issuance of licenses for emission of pollutants into the atmosphere by stationary sources of pollution is to be established by USSR Council of Ministers.

If the established permissible emission norms are exceeded because of an accident, the directors of enterprises, institutions and organizations are obliged to report this quickly to the agencies, which exercise state control over air pollution and must adopt, in the order called for by regulations, measures for the control and elimination of the air pollution.

In cases of violations of the conditions established by licenses for emission and also in cases which threaten public health, the pollution emissions must be limited, suspended or forbidden by judgment of the agency which exercises state supervision of air pollution control, up to the shut-down of individual industrial devices, shops, enterprises, institutions and organizations.

Upon receiving warning (as provided in Article 23 of this law) by the state service of observance and supervision of the level of environmental pollution concerning the possible increase of air pollution levels as a result of bad weather conditions, enterprises, institutions and organizations are obliged to follow specific measures for reducing permissible pollution levels in accordance with the agencies which exercise government supervision over air pollution control.

Article 12. Fulfillment of the Requirements for Air Pollution Control During Siting and Development of Towns and Other Populated Areas

During planning of the siting and development of towns and other populated areas, there must be considered the existing state of air quality and prognoses of possible changes of it and the task of preventing air pollution.

The designing, development and reconstruction of towns and other populated areas must be conducted in accordance with sanitary-hygienic and other norms and rules for air pollution control. Soviets of People's Deputies must take measures for the improvement of the organization of public services and amenities of the territory of populated areas while the enterprises, institutions and organizations which are occupying these production and other areas must take measures to prevent or reduce air pollution.

In regions where the air is affected by the activity of groups of enterprises, institutions and organizations, comprehensive measures for "cleaning up" the air are to be developed and implimented in a procedure established by legislation of the USSR and union republics.

In cases in which reduction of the harmful effects of air pollution is impossible, enterprises, installations and other objects which produce such an effect, are to be transferred in an established order into another locality or specialty of their manufacture which is subject to change.

Article 13. Siting, Design, Construction and Putting Into Operation of Enterprises, Installations and Other Objects Which Affect Air Quality

During siting, design and putting into operation of new and renovated enterprises, installations and other objects and, during improvement of existing and introduction of new industrial and technological processes and equipment the air quality must be considered and measures must be taken to ensure minimal emission of pollutants into the air or their complete exclusion and catchment, utilization and rendering harmless of wastes must be realized requirements for protecting the air from harmful effects of other chemical, physical and biological factors must be obeyed.

The construction sites of enterprises, installations and other objects which affect air quality are to be coordinated with agencies which exercise state supervision over air pollution control and other agencies in accordance with legislation of the USSR and union republics.

Projects of the indicated enterprises, installations and other objects are to be coordinated with agencies which exercise government supervision over air pollution control and other agencies in cases and by a procedure established by legislation of the USSR.

The placing in operation of new and renovated enterprises, installations and other objects which do not meet the requirements for air pollution control is forbidden.

Article 14. The Observance of Air Pollution Control Requirements During Introduction of Discoveries, Inventions, Efficiency Expert's Suggestions, New Technical Systems and During Purchase From Abroad Of Industrial Processes, Equipment and Other Objects

The introduction of inventions, discoveries, efficiency expert's suggestions and new technical systems and also the purchase abroad, the introduction into operation and the use of technological processes equipment and other objects are forbidden if they do not meet the standards for air pollution control established in the USSR.

Article 15. Regulation of Emission of Pollutants Into the Air By Automobiles, Airplanes, Other Transportation Devices and Also Automotive Devices and Apparatus

Ministries, state committees and departments, enterprises, institutions and organizations which design produce and operate automobiles, airplanes, other transportation devices and also automotive devices and apparatus are obliged to develop and carry out a complex of measures for the prevention and reduction of pollutants emissions into the atmosphere by these devices and apparatus.

Emissions of pollutants by transportation and by other automotive devices and apparatus must not exceed established standards for maximum permissible emissions.

All transportation and other automotive devices and apparatus being operated must be under systematic supervision of the state of pollutants emissions. The rules of supervising such emissions are to be established in a procedure determined by the USSR Council of Ministers.

Transportation and other automotive deivces and apparatus, whose pollutants emissions level exceeds the established standards are forbidden.

Article 16. Fulfillment of the Requirements for Air Pollution Control During Use of Means of Plant Protection, Growth Stimulators and Other Preparations in Agriculture and Forestry

The list of plant protection agents, plant growth stimulators, mineral fertilizers and other preparations, the use of which is permitted in the agriculture and forestry of a given locality, must be agreed upon by specially commissioned agency for state supervision of air pollution control in a procedure,established by legislation of the USSR and the union republics.

During development of new preparations, used for these purposes in agriculture and forestry, there must be developed standards of maximum permissible concentrations and methods for determining residual qualities of these preparations in the air.

Kolkhozes, sovkhozes, other enterprises, institutions, organizations and also citizens are obliged to observe the rules concerning transportation, storage and use in agriculture and forestry of means of plant protection, plant growth stimulators and other preparations in order to prevent air pollution from them.

Article 17. Fulfillment of the Air Pollution Control Requirements During Recovery of Minerals, the Conducting of Explosion Operations, Locating and Use of Waste Piles, Spoilbanks and Dumps

The recovery of minerals, explosive operations, locating and use of waste piles, spoilbanks and dumps must be conducted with observance of the rules for prevention or reduction of air pollution by methods agreed upon with agencies which exercise state supervision of air pollution control and also with other agencies in accordance with legislation of the USSR and the union republics.

The location in populated areas of waste piles, spoilbanks and dumps, the storing of industrial wastes, everyday wastes of production and other wastes, which may produce air pollution from the dust, harmful gaseous substances and vile-smelling substances and also the burning of these wastes on the premises of enterprises, institutions, organizations and populated points are forbidden except in cases in which the burning is conducted with the use of special devices which meet the requirements for air pollution control.

Enterprises, institutions and organizations are obliged to ensure the timely removal of wastes which pollute the air at enterprises which use them as raw material or in specialized dumps.

Article 18. Prevention, Reduction and Elimination of Harmful Effect of Physical Factors On the Atmosphere

Enterprises, institutions and organizations are obliged to develop and carry out measures for the prevention, reduction and elimination of the harmful effects of physical factors (radiations, sound vibrations, including noise, etc.) on the atmosphere.

Control of industrial and other noises must include the following: the introduction of low-noise technological processes in industry and other sectors of the national economy; improvement of designs of transportation vehicles and the procedure for their operation, maintenance of railroad and trolley tracks, highways, and street surfacings; location of industrial and other installations and equipment which are noise sources at necessary distances from populated areas and residential buildings; improvement of the planning and building of towns and other populated areas; organized measures for prevention and reduction of everyday noises.

The citizenry are obliged to observe the requirements established for the purposes of control of household noises in apartments and also residential courtyards, on the streets, in rest areas and other public places.

Any physical effect on the air is permissible only if it does not exceed the established maximum permissible standards. Upon infringement of the indicated requirements, the activity responsible for this at enterprises, institutions and organizations may be suspended, limited or prohibited by the verdict of the state supervision agency for air pollution control, up to complete shut-down of individual industrial and other devices, shops, enterprises, institutions and organizations.

Article 19. Regulation of the Use of Air for Industrial and Other National Economic Needs

The use of air in large volumes for industrial and other national economic needs may be limited, suspended or prohibited by state air pollution control agencies in any cases in which such use of the air will lead to changes of air quality, be hazardous to human health or to the plant and animal world.

Article 20. Regulation of Effects on Weather and Climate

Actions directed toward artificial changes of the state of the atmosphere and atmospheric phenomena for national economic purposes may be provided for by ministries, state committees and departments, by enterprises, institutions and organizations only upon authorization of government agencies specially commissioned for this and only under condition that this does not lead to unfavorable effect on the weather and climate.

Article 21. Material and Moral Incentive for Carrying Out Measures for Air Pollution Control

Legislation of the USSR and the union republics provides for measures for material and moral incentive of collectives of enterprises, institutions and also for individual workers in order to encourage implimentation of measures for air pollution control.

III GOVERNMENT REGISTRATION OF OBJECTS WHICH CONSTITUTE AIR QUALITY HAZARDS AND THE DIMENSIONS OF THIS HAZARD

Article 22. Government Registration of Objects Which Constitute A Hazard to Air Quality and the Dimensions of this Hazard

All objects which constitute a hazard to air quality and the dimensions of such a hazard are subject to state supervision which is to be conducted by unified system for the USSR and according to rules confirmed in a procedure determined by the USSR Council of Ministers.

IV SUPERVISION AND INSPECTION IN THE AREA OF AIR POLLUTION CONTROL

Article 23. Supervision of Air Quality

Supervision of air quality according to chemical, physical and biological indicators is to be carried out by the state service of supervision and inspection of environmental pollution levels and is conducted by a procedure determined by legislation of the USSR.

Collection, storage, search and processing of information concerning air quality is carried out according to a unified system.

The state service for supervision and inspection of pollution levels of the natural environment is entrusted with providing interested state agencies, enterprises, institutions and organizations with systematic information and forecasts concerning air pollution levels under the effect of economic activity and meteorological conditions.

Article 24. Especially Dangerous States of the Atmosphere

The state service for supervision and inspection of pollution levels of the natural environment is obliged to notify promptly executive committees of local Councils of People's Deputies, interested enterprises, institutions and organizations concerning the threat of occurrence of an especially dangerous state of the atmosphere.

If, as a result of an unfavorable combination of weather conditions, pollutants emissions into the air and other effects on the atmosphere, there arises a sudden change of air quality which threatens human health, executive committees of local Councils of People's Deputies, upon receiving notice of this, by the state environmental control service will give instructions for transfer to a special regime of operation or a temporary suspension of operation of enterprises, institutions, organizations and means of transportation in order to reduce the severity of emissions and in order to avoid other harmful effects upon the atmosphere and will provide for temporary evacuation of the population and take other necessary measures.

Article 25. State Supervision of Air Pollution Control

State supervision of air pollution control has the task of ensuring the observance by all ministries, state commissions and departments, state, cooperative and other public enterprises, institutions and organizations, as well as citizens, of air pollution control measures, the observance of the conditions for air pollutants emissions into the atmosphere and also observance of the other rules, established by legislation concerning air pollution control.

State supervision of air pollution control is entrusted to Soviets of People"s Deputies, their executive and management agencies and also agencies especially authorized for this by the state in a procedure, established by legislation of the USSR.

V. SETTLEMENT OF DISPUTES CONCERNING AIR POLLUTION CONTROL

Article 26. The Procedure for Resolving Disputes Concerning Problems of Air Pollution Control

Disputes concerning problems of air pollution control are to be resolved by Councils of Ministers of union republics, Councils of Ministers of autonomous republics, executive committees of local Soviets of People's Deputies and also by agencies specially authorized for this in a procedure established by legislation of the USSR and union republics.

Disputes between state and public organizations of one union republic and state and public organizations of another union republic concerning air pollution control problems are to be examined by a commission formed on an equal footing from representatives of the interested union republics. In case the commission cannot reach agreement, disputes on these problems are subject to examination by a procedure, determined by the Council of Ministers USSR.

Disputes concerning property and associated with activities concerning air pollution control are to be resolved by a procedure established by legislation of the USSR and union republics.

VI RESPONSIBILITY FOR VIOLATION OF THE LAW CONCERNING AIR POLLUTION CONTROL

Article 27. Responsibility for Violation of the Law Concerning Air Pollution Control

Persons guilty of violation of the law concerning air pollution control will incur criminal, administrative or other responsibility in a procedure established by legislation of the USSR and union republics.

Article 28. Reimbursement for Harm Caused As A Result of Violation of Legislation Concerning Air Pollution Control

Enterprises, institutions, organizations and citizens are obliged to make reimbursement for damage caused by infringement of the laws concerning air pollution control to the amounts and by a procedure established by legislation of the USSR and union republics. Officials and other workers who are to blame for enterprises, institutions and organizations suffering losses associated with reimbursement for damage will bear the economic responsibility in an established procedure.

VII INTERNATIONAL TREATIES

Article 29. International Treaties

If rules are established by an international treaty of the USSR other than the air pollution control rules in the USSR legislation, the rules of the international treaty take precedence. The same situation prevails in case of discrepancy between legislation of the union republic and an international treaty concluded by it.

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RESOLUTION ON AIR POLLUTION

Moscow VEDOMOSTI VERKHNOGO SOVETA SSSR in Russian No 48/28 Nov 79 pp
pp 947-948

[Resolution no. 805 of the Presidium of the USSR Supreme Soviet; L. Brezhnev, Chairman of the Presidium of the USSR Supreme Soviet; M. Geogradze, Secretary of the Presidium of the USSR Supreme Soviet, Moscow, Kremlin, 20 November 1979: "On a Draft of USSR Legislation Concerning Air Pollution"]

[Text] The Presidium of the USSR Supreme Soviet resolves:
1. The draft for USSR Legislation proposed by the USSR Council of Ministers concerning air pollution will be published in the newspapers IZVESTIYA SOVETOV NARODNYKH DEPUTATOV SSSR, SOTSIALISTICHESKAYA INDUSTRIYA and republic newspapers (in the languages of the nationalities) for public evaluation.

2. The draft of USSR Legislation on air pollution will be submitted for a preliminary examination to the committees on natural conservation and the efficient utilization of natural resources, on legislative proposals, on health and social welfare, on industry, on transportation and communication and on agriculture in the Union Council and in the Council of Nationalities. The aforementioned permanent committees are to examine the proposals and notes on the legislative draft which are received as a result of its publication, to introduce the necessary amendments and corrections to the draft with a consideration of public comments and to present conclusions on the draft.

All comments and proposals on the legislative draft should be sent to the following address: Moscow, Kremlin, Secretariat of the USSR Presidium of the Supreme Soviet.

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WORK PLAN OF UKRAINIAN CONSERVATION SOCIETY

Kiev PRAVDA UKRAINY in Russian 21 Dec 79 p 3

[Article: "Nature Has Millions of Friends"]

[Text] One of the largest organizations in the republic is the Ukrainian Society for the Conservation of Nature, which has 12 million members. Primary organizations of nature-lovers have been organized in enterprises, kolkhozes and educational institutions. For example, they are active at the Zhdanov Metallurgy Plant imeni Il'ich, at the Cherkass Chemical Fiber Plant, at the Kolkhoz imeni Lenin of Novgorodkovskiy Rayon in the Kirovograd area. The society's propoganda work is carried on by about 200 popular "Nature" universities, by collectives of Houses of Nature opened in oblast centers and large cities as well as by newspapers, television and radio.

Facts and figures which convincingly attest to the universal concern for preserving and increasing natural resources were presented at a meeting of the republic's soviet of the Ukrainian Society for the Conservation of Nature, held on 20 December in Kiev. The activities of organizations of nature-lovers were examined at the meeting, as were their goals in the light of the resolution of the CPSU Central Committee, "On Further Improvements in Ideological and Political-Educational Work." Participating in the work of the soviet were the representatives of party and soviet organs, ministries and departments and scientific institutions as well as activist environmentalists. The chairman of the State Committee of the UkSSSR on the Conservation of Nature, D. I. Protsenko, presented a speech.

Specific measures for the continued improvement of organizational and propoganda operations of the society were planned at the meeting and the work plan for 1980 was confirmed.

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USSR

ARTIFICIAL REEFS ON BLACK SEA SHELF

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 11 Dec 79 p 3

[Article by V. Shamsha, Odessa: "The Ecological Service of the Coastland"]

[Text] A high wave, rolling above the ridge of underwater blocks, decreased its pace and with a barely-perceptible roll moved on without doing damage to the shore or to the coastal fauna.

This is how a unique ecological system developed on the Black Sea shelf near Odessa operates with the aid of artificial reefs. Granite rock, the purest and strongest natural material, was used for this purpose for the first time.Not subject to erosion, it dependably protects the shore from the destructive action of waves and simultaneously serves as an excellent shelter for sea animals which clean the coastline strip.

The idea of constructing artificial reefs was born many years ago in the collective of the Odessa Division of the Institute of Biology of Southern Seas of the UkSSR Academy of Sciences. Studies revealed that as a result of coast protection works which have been carried out here for over 10 years, limestone rocks and stones which had served as a jetty for fish, molluscs and shrimp were destroyed. Deprived of their ancient habitat, they unsuccessfully tried to inhabit the monolithic slabs of reinforced concrete wave breakers.

Scientists and engineer-ecologists of the NII [Scientific Research Institute] of Ukryuzhgiprokommunstroy[Southern Ukrainian Institute for the Planning of Municipal Construction] developed the project of reefs made from simple granite. Only a few months have passed since the first rocks were placed on the sea bottom, but the underwater exploration of hydrobiologists has already revealed that resettlement is in full swing, that fish are accumulating around the reefs and that molluscs are inhabiting secluded areas.

"The system of artificial reefs has exceeded all our expectations," says Yu. Zaytsev, corresponding member of the UkSSR Academy of Sciences. "It has best solved problems that occur unavoidably when man and nature in the shelf zone interact. In the future this strip will grow and in time will extend along the entire Black Sea coast."

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EDITORIAL ON ENVIRONMENTAL QUALITY

Minsk SOVETSKAYA BELORUSSIYA in Russian 25 Nov 79, p 1

/Editorial: "To Care for Nature"/

/Text/ Great attention is given to the preservation and augmentation of the earth's resources both in our republic and throughout the country. This is completely in order. "Nature,' said comrade L.I. Brezhnev, 'did not lose for us its vast value as a primary source of material well-being and as an inexhaustible source of health, joy, love of life and spiritual riches of each person... The thrifty, zealous use of natural resources, concern for the earth, the forests, the rivers and pure air and for the plant and animal world are all vital Communist matters of concern."

Documents of Party Congresses and of many sessions of the USSR Supreme Soviet are filled with concern for environmental protection and preservation of plant and animal world. This acute problem was emphasized greatly in the new Constitution, the Basic Law of the Land.

With constant concern for preservation of the natural beauty of the land, and control of air and water pollution, our government allocated 11 billion rubles for the realization of environmental protection measures in the present five-year plan. The use of these funds with the highest efficiency is a vital duty.

The main trends, which will ensure reliable protection of nature during growing economic development, include further increase of the degree of complex use of its resources, the development and introduction of new low-waste technologies, closed circulating water cycles and a rapid reduction of the amount of waste. The solution of this problem requires the equipping of all industrial enterprises with modern technological equipment which will permit the realization of all environmental protection measures planned. It is conforting to know, for example, that, thanks to new technological solutions, the chemical industry will consume no more fresh water in 1980 than it did in 1970 although its production output increased 1.7 times in that decade. In our republic, collectives of such chemical enterprises as Lida Paint and Varnish Plant, Grodno Chemical Combine and Svetlogorsk Synthetic Fiber Plant are dealing with nature with thrift and wisdom. Closed circulating water systems are operating and wastes are being converted into useful raw material or products for the national economy at these plants. The solution of scientific and technical problems is coordinated closely with the environmental protection problem.

To protect and improve nature, to do everything possible so the Soviet land is a blooming land is a most important obligation. This should be remembered in each ministry, at each enterprise and in each collective. Regrettably, the protection of the world of nature and the multiplication of its riches is not given the necessary concern everywhere and by everyone. Thus, many enterprises of the BSSR Ministry of the Food Industry are failing to fulfill environmental protection plans from year to year. What tremendous damage, for example, Tolochin Starch Plant and Lyntupy Alcohol Combine are inflicting on the environment where standard purification installations are missing and closed recirculating water supplies are not used. Party and Soviet agencies must struggle fiercely against those who are still captives of obsolete ideas and who assume the main concern is fulfillment of the production plan while forgetting about environmental protection.

Our need for mineral raw material increases yearly. Extraction of minerals by the most economical open pit method is expanding. In connection with this, the reclamation of the lands stripped and the return of them to agricultural use have become serious problems. We cannot reconcile ourselves to a situation which would see areas worked by strip mining unreclaimed and not returned to arable land for years or even for decades. Often, there are still cases in which land reclamation is conducted with deviations from designs. Such sections are returned to a sovkhoz or kolkhoz but it is impossible to grow anything on them. Commissions, accepting recultivated areas must consider the quality of the reclamation with principle and care and hold those who do improper work to strict accountability.

More than 600,000 hectares of wetlands and marsh-ridden lands in Belorussia will be reclaimed in the current five-year plan. The state has allocated large appropriations for this. It is the duty of industrial executives to provide for long service of reclaimed areas, especially peat-bogs. However, there is no concern for this in many places. In Luntnets, Zhitkovichi, Pinsk and some other wooded regions, shallow long disused peat-bogs are being used for growing intertilled crops which produces intense mineralization of the soil. No economic necessity can justify such a shameful practice.

Forests play a major role in protecting soils from wind erosion and water erosion and in the struggle for the increase of yield of farm crops. They also preserve the animal world, ensure the purity of air and water and preserve the silence and have a beneficial effect on the health of people. This is why a careful, proprietary attitude toward the forest is a matter of great state importance. Even in the first years of the Soviet regime, V.I. Lenin called attention to the necessity for the most judicious use of the forest resources. "He felled a tree-plant two;" this should be the absolute rule for all and certainly for foresters. We must plant trees on all convenient spots, ravines and slopes and create protected strips along rivers, lakes and ponds and turn cities and village greens with plantings.

Under conditions of scientific and technical progress control of industrial emissions into the environments has become a vitally important problem. Air pollution control involves, first of all, concern for health. The Party, the government and society have already done much to manage this problem but much remains to be done. In each town and workmen's settlement and at each enterprise, there must be established strict control over sanitation of the air and observance of technologies which prevent industrial emission. Air quality depends on the sanitary state of the town, the level of organization of public services and amenities and the degree of planting of greenery.

Environmental protection is a multifaceted problem. The care for the earth and the depths of the earth, for the water resources, the plant and animal world, for the preservation of environmental quality and for ensurance of renewal of natural resources, is the duty of each Soviet person.

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USSR

BIOLOGICAL METHOD FOR WATER PURIFICATION

Minsk PROMYSHLENNOST' BELORUSSII in Russian No 10, Oct 79, pp 59-60

[Article by Zimenko, doctor of Biological Sciences, I. Zhigunov, Candidate of Chemical Science, G. Prokazov and A. Snyatkov, senior engineer: "Returning Oxygen to Water"]

[Text] As is well known, the problem of purification and use of waste waters has two aspects. The first is the debit of water consumption. We see that production of one ton of dacron requires 1000 cubic meters of water, production of a ton of viscose rayon requires 1200 cubic meters and production of one ton of capron fiber requires 2500 cubic meters of water. Reduction of the norms of water intake for industrial purposes would not only reduce production costs but also would save a scarce raw material. The second aspect of the problem is the polluted industrial waste waters which are unsuitable for further use. In addition to this, such water constitutes an epidemiological hazard.

There are many methods of purification of waste waters. The most widespread are reagent methods of purification. Their use makes possible reduction or oxidation of admixtures and production of low-toxic or nontoxic products, neutralization of acid and alkali, conversion of soluble substances into insoluble compounds. However, even after this, the purified waters cannot be used repeatedly in manufacture. Additional treatment of them is required.

Another method is biological, aerobic purification in different types of installations (air tanks, biofilters, ponds). Preliminary aeration usually is performed in special installations in which air is blown through the liquid for 15-20 minutes. Settling and preliminary aeration is performed in biocoagulators (vertical settling tanks with a biocoagulation chamber) into which the air and activated sludge are fed. The effectiveness of removal of suspended substances in this type of settling tank is increased by 65-75 percent.

The most extensive use of the biological method of waste water purification is found in the chemical industry. It ensures thorough removal of organic substances from large amounts of water. Regrettably, there are many places in which this method cannot be used. In view of this, we want to offer some recommendations concerning conditions which must be present in order to purify industrial waste waters by the biological method. First, the organic substances found in the waste waters must be oxidizable. Second, their concentration must correspond to the oxidizing capacity of the installations (usually not more than 100 mg/l)for biological absorption of oxygen. Third, the effluence should contain the necessary nutrients (nitrogen, phosphorus, potassium). Finally, the waste waters must not contain toxic substances which may prove to be harmful to the microflora in the activated sludge. Therefore, for biological purification, concentrated waste waters must be diluted by other slightly concentrated water, ordinary municipal water and, in case of necessity, even pure water. This circumstance should be considered during development of sewage systems layouts, especially during solution of problems of separation and unification of discharges.

In some cases, an electrochemical method of purification of industrial waste waters is effective. It can be used to remove many organic substances, especially phenols and cyanides from water. Anodic oxidation on insoluble electrodes in the presence of kitchen salt, goes energetically. The chlorine being given off during this accelerates the oxidation process and increases the degree of purification of the waste waters.

Electrochemical coagulation is accomplished by passing waste waters through electrolyzers with a soluble anode. This produces coagulation of the fine dispersions, sorption and electrochemical separation of dyes and effective (more than 94.6 - 94.8 percent) removal of the heavy metals in the sediment.

The electrocoagulation method also permits simplification of the technological layout and operation of installations during purification of discharges of a complex composition. Substitution of mineral coagulants for electrochemically soluble Fe^{+2} or Al^{+3} ions prevents secondary contamination of industrial discharges by sulfates or chlorides. The significant adsorption capacity of ferric hydroxide or ammonium hydroxide at the moment of heating and other processes cause a high effect of purification of water on dispersed and some soluble admixtures and permits reduction of the dose of electrolytic coagulant calculated per metal. During industrial exploitation or in case of repeated use of purified waters, this presents a real and significant advantage.

As a rule, during use of devices at operating enterprises and at stages of designing purification installations, it is advisable to maintain the principle of separation of discharges according to concentration indicators.

This ensures a rational combination of concentrated, used-up electrolytes in reactions of reciprocal neutralization and decontamination. The technical solution of these problems is associated with specific features of production.

Research for the introduction of purification with the use of soluble electrodes permitted the development of a typical layout of purification installations (Figures 1,2).

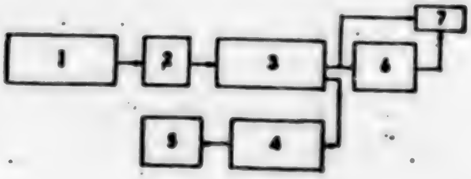


Figure 1
1 - sperge waters storage tank; 2 - electrolyzer with soluble steel and highspeed electrodes; 3 - settling and filtration layout; 4 - watery sludge storage; 5 - filter press; 6 - unit for desalification of purified effluence; 7 - pure water consumers.

BASIC FLOW SHEET OF ELECTROCOAGULATION PROCESSING OF INDUSTRIAL EFFLUENCE

Production

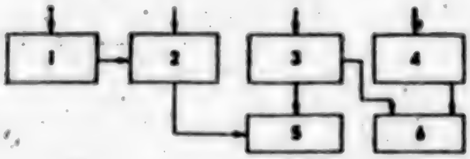


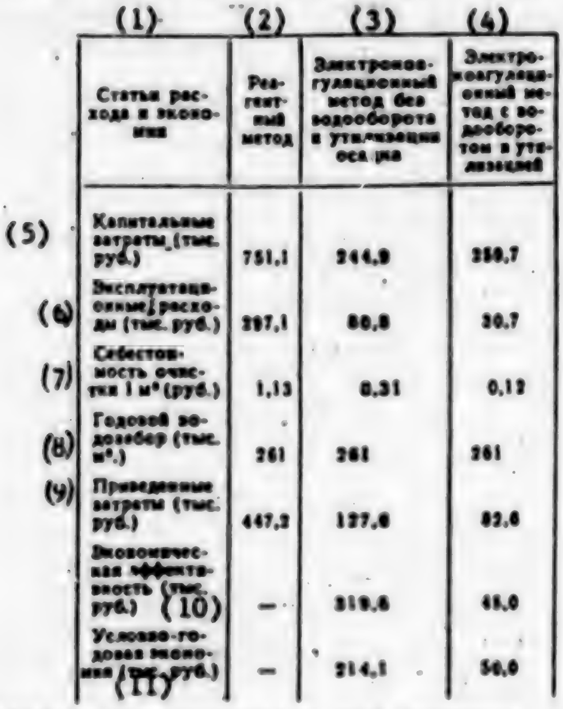
Figure 2
1 - acid electrolytes storage; 2 - chromium-containing electrolytes storage; 3 - alkaline electrolytes storage; 4 - storage of wastes of the pickling baths and wastes of the electro-deposits (Sn,Ni,Ca) baths; 5 - unit for decontamination of chromium-containing effluence; 6 - unit for decontaminating wastes of electro-coatings by non-ferrous metals (Sn, Ni, Ca) baths.

We must add that purification of industrial waste waters by presently used methods is not a basic means of protection of reservoirs from pollution by industrial effluence. In ensuring the possibility of reducing pollution by effluence or by replacing highly-toxic, pollution-producing fettlings, we merely reduce the loading on the water treatment installations of a town. The degree of pollution of reservoirs is not reduced.

All of this predetermines the reversal, being noticed, from the purification of waste waters to a system of measures, directed toward the reduction and, in the future, complete elimination of the discharge of industrial waste waters into reservoirs and to replacement of a once through system of water supply of enterprises by a circulating system.

Organization of a circulating water supply requires recycling the purified water, that is, creating a closed circuit. Water from the settling tanks must be sent through a system for separating finely dispersed suspensions and soluble alkali earth metal to the consumer. Simultaneously, natural losses of water by evaporation and withdrawal by the products produced must be replaced.

A necessary step in the system of measures for ensuring pollution control is the utilization of products from purification of effluence and their industrial use as technological raw material. We shall consider a complex evaluation of the effectiveness of the method of purification based on the example of the Minsk refrigerator plant, which uses the electrocoagulation method of purification of waste waters (see Table).



(1) Статьи расхода и экономии	(2) Реагентный метод	(3) Электрокоагуляционный метод без водооборота и утилизации осадка	(4) Электрокоагуляционный метод с водооборотом и утилизацией
(5) Капитальные затраты (тыс. руб.)	751,1	244,9	250,7
(6) Эксплуатационные расходы (тыс. руб.)	297,1	80,8	20,7
(7) Себестоимость очистки 1 м³ (руб.)	1,13	0,31	0,12
(8) Годовой водозабор (тыс. м³.)	261	261	261
(9) Приведенные затраты (тыс. руб.)	447,2	127,6	82,6
Экономическая эффективность (тыс. руб.) (10)	—	319,6	48,0
Условно-годовая экономия (тыс. руб.) (11)	—	214,1	50,0

Key:
1. Articles of consumption and savings
2. Reagent method
3. Electrocoagulation method without water recycling and use of sediment
4. Electrocoagulation method with water recycling and use of sediment
5. Capital expenditures (1000's of rubles)

(continued on next page)

(Key for Table on preceding page continued)

6. Operational expenditures (1000's of rubles)
7. Cost of treating 1 m^3 (rubles)
8. Annual intake (1000's of m^3)
9. Cited expenditure (1000's of rubles)
10. Economic effectiveness (1000's of rubles)
11. Relative annual savings (1000's of rubles)

The introduction of purification with recycling and use of the sediment would produce an annual economic effect of 450,000 rubles. Expenditure of fresh water is reduced 10 times and discharge into the sewage system i is stopped. Reduction of water consumption (1865 m^3/day) and water diversion (1014 m^3/day) due to creation of systems of secondary recycled water supply of chemical pollutants of effluence is planned for the Brest Gas Apparatus Plant.

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USSR

WATER PURIFICATION PLANT UNDER CONSTRUCTION IN OL'GIN

Leningrad STROITEL'STVO I ARKHITEKTURA LENINGRADE in Russian No 11, Nov 79 pp 33-35

[Article by S. Ye. Bogdanskiy: "The Northern Aeration Plant"]

[Text] A complex of purification installations is being constructed at Ol'gin settlement.

Problems of protection and rational use of water resources is now of great importance. A special section in the complex plan of economic and social development of Leningrad and the oblast, providing for an entire series of measures for the design and construction of purification and channelization installations is devoted to these problems.

According to the general layout of channelization, developed by Lengiproinzhproyekt, there will be established a reliable system of universal purification of municipal effluence. Three independent complexes are being constructed for this purpose. The first of these, which will serve the central part of the city and the left bank of the Neva River, will be located on Belaya Island. The first stage, as was reported in this journal (see "Leningrad Construction and Architecture" No 7, 1973) is already operating. The right bank and northern part of the town is being serviced by a complex in Ol'gin settlement, while the Krasnosel'sk Rayon and Strel'na is being serviced by the southwestern aeration station. The planned date for completion of the entire program is 1985.

Construction of the northern purification installations in Ol'gin was begun in 1976 and is now at its height. In order to present the magnitude of the construction, we think it will be useful to examine, if only in general features, the layout and principles of action of the complex, consisting of three autonomous (from the point of view of erection) rather complex objects.

First and foremost is the main undergroung channelization collector 12 km long and 5.5 m diameter. It will conduct all effluence from street and outbuildings to the complex. Subdivisions of Lenmetrostroy are building the collector. It was here that the brigade, lead by A.A. Mal'shev, in the beginning of 1978, set a world record for tunnelling 876 m in one month. (This also was described in issue No 4 1978 of this journal).

The main pumping station (GNS) is the heart of the complex. The technological purification process begins here. The 307th board of the Spetstonnel'stroy (special tunnel construction) trust and bridge detachment-3 of the Mostostray-6 (bridge construction trust) created this most complex engineering installation.

The largest volume of work is involved in construction of natural purification installations, consisting of dozens of objects differing in their nature. The general contractors here are the 58th board of the Spetstonnel'stroy trust and the Leninzhstroy (Lenin Construction) trust.

After the effluence enters the GNS (main pumping station) powerful pumps send them into the receiving compartment, whence they flow by gravity through a block of reception and distribution devices, special grids and sand catchers in order to remove large mechanical inclusions. After being filtered here, the effluence enters 8 primary settling tanks (6 m high and 54 m diameter). A large part of the suspended particles is trapped here.

The effluence then proceeds to the biological purification and air tanks, consisting of 2 elongated reinforced concrete reservoirs, each of which is divided into 7 sections. Here the clarified liquid is mixed with activated sludge which, upon delivery of oxygen, oxidizes the organic compounds.

Then, the liquid passes along underground pipelines into secondary radial settling tanks. There, the activated sludge, having performed its function, is removed and the purified water, passing through sand filters (the pre-purification block) enters the outlet chamber.

The concluding step of the technological cycle is the discharge of the purified water into Finland Gulf via 12 pipelines: 6 with a length of 1 kilometer each, laid on dry land and 6 of 1½ km length extending into the water off the shoreline.

Waste water residues, precipitated in the purification process, will proceed into heat treatment shops, passing through seals and regulator-batchers where its maximum concentration is achieved. The precipitate ferment proceeds into tanks and the gas formed during this is collected in gas tanks.

In addition to the enumerated objects which are extremely complex from an engineering point of view and which ensure the technological process of purification, some auxiliary installations are being developed. These include a pumping-air blowing station which produces the air for aeration of waste waters, the boiler and mazut set-up, shops, warehouses, a 10-story building of the administration and everyday amenities wing.

The design capacity of the first stage of the complex is 1 million cubic meters of purified water per day. There are provisions for construction of a second stage with the same carrying capacity and there will be a third, if necessary. There is much work yet to be completed. It is no accident that completion of the first stage required 7 years.

Much has been completed. All 8 primary settling tanks are erected. At first, the construction of each of them required one-half year. The last were erected in 3 months. Many conduits and pipelines have been laid to interconnect the individual objects of the complex.

Construction of the pumping air-blowing plant has begun. Crews of the bridge detachment-37 have excavated 15 m deep for installation of the underground part of the main pumping station. The depth of the reinforced concrete "sleeve" must be 60 m, the same as its diameter. For Belaya Island, these parameters are 50 m and 51 m respectively. The work is being performed by the "well sinking" method which should reach the levels required after 26 months of sinking.

The rhythmic fulfillment of the program greatly facilitates specific preparation for production. The concrete mixing plant produces 400 cubic meters per day and the chief mechanic's sections is well equipped as are the lathe and metal working shops. Networks, frameworks and foundations layings for communications devices and foundations are being prepared for the area. Convenient living quarters, dining rooms, an administration building and equipment depots are being constructed.

"This project is, of course, unusual for the Spetstonnel'stroy trust subdivision," says chief engineer of the 88th board A.A. Minasyan. "You know our specialty involves collectors, underground passages and pumping stations. This project, however, involves a huge volume of above ground installations. This requires such specialists as bricklayers and fitters which we did not have. We selected some persons and sent them to school. They mastered the new skills required, studied the experience of conducting the same kind of an installation on Belaya Island. Now we are building and even streamlining the technology of the operations."

A.A. Minasyan continues, "for example, during installationf of monolith conduits of primary settling tanks for the discharge compartment, we used a sliding metal casing instead of a wooden one and saved considerable lumber. All of our complex crews, directed by V.A. Artemenko, V.S. Kropotov, I.S. Kudinov and F.I. Sorochinskiy work on the self supporting (not financed by the state) method. We tried to achieve a maximum degree of pre-assembly of items. Moreover, if we did not experience a chronic shortage of trucks, excavators and bulldozers, the production rates, possibly, would be even higher."

Actually, technicians, frequently are transferred from Ol'gin to other projects and, nevertheless, we are maintaining the rhythm of construction. Now and then the materials supplied do not meet the needs for them. This is explained easily: the northern purification installations are not yet transferred; they are not yet in operation; there are 3 years to go.

Such an attitude will, in the very end, give undesirable results. A serious lag is accumulating and it will be extremely difficult to make up for it. The intolerability of such situations is indicated many times in decrees of the Central Committee CPSU and the USSR Council of Ministers "Concerning the Improvement of Planning and Expandion of the Influence of the Economic Mechanism and the Increase of Effectiveness of Production and the Quality of Operation."

The situation can be improved greatly, if according to the experience of installation of the Belaya Island project, there also is created here a construction area trust based on the generally organized administration. As a generally organized administration, it could make contracts with subcontracting organizations, have its own mechanization sections, construct a firmer production process. Certainly, such a solution is warrantedeven more so in view of the fact that, of 21 million rubles, assimilated by the Spetstonnel'stroy trust this year, 11.5 million went to the 88th administration.

There is a continuous shortage of workers at the construction. This, as is well known, is the result of the economic indifference of people. Since the purification installations are in the category of objects of the municipal economy, there is no possibility, at them, of awarding a bonus for bringing into production industrial objects with an estimated cost of more than 1 million rubles. This is scarcely fair, considering the cost, duration and scales of construction and also the national economic importance of a complex being constructed in accordance with the USSR Council of Ministers "Measures for Improving Pollution Control in the Baltic Sea Basin."

The northern purification installations will become the mightiest in a network of municipal sewage systems. Even though the complex on Belaya Island is not much older, the Ol'gin construction is proceeding with consideration of its operation.

Designers have introduced many improvements. Thus, all water containing objects are being completed by now on the basis of a specially developed catalog of articles. The shoes on which the capacity installations are installed in sections on reinforced concrete bottoms. At Belaya Island, this conjugation was conducted "on dry land" which now and then caused problems because of sinking of the soil. Upon the recommendation of VNIIB /All-Union Scientific Research Institute of Hydraulic Engineering/ imeni Vedeneyev, use is being made of a colloid, polymer cement solution as a hydraulic insulation coating of the inside parts of settling tanks and air tanks which permits achievement of maximum effect.

The use of gas collected in tanks is being envisaged. It will be burned in the boiler and in the shop for degassing and drying sediments. The possibility of use in this shop of powerful centrifuges instead of vacuum filters which provide higher quality processing of the sediment is being considered.

Construction workers have made valuable suggestions. A group of specialists of the 304th administration and the Spetstonnel'stroy trust developed their own version of insulation of the bottom of air tanks by the use of special asphalt instead of the 4-layer waterproof coating on bitumen mastic on concrete. This saved 70,000 rubles for each air tank. One-half million rubles were saved the government by the suggestion of the 298th administration of the Spetsstroy trust, which suggested lowering the ground water level during installation of the land discharge section not by well points, as provided by the design, but with the help of specially created system made from asbestos cement pipes, a conduit and a well.

Builders intended to finish all operations on installation of communications of the primary settling tanks by the end of the year. It was decided to complete mastering the sludge areas situated 10 kilometers from the basic area, ahead of schedule. Turf removal is being conducted for this purpose. Next year, erection of the land section of the air-blowing station and a 10-story administration and domestic wing will begin. All graphs of construction and installation operations are compiled so that, in proportion to their realization, the installation of equipment can begin immediately. The combination of these processes is provided for in all cases possible.

Every month there arrives more workers in the area, the number of organizations occupied here already exceeds dozens and this will increase constantly. Therefore, the necessity arises for clear cut coordination of the actions of all contractors. Therefore it is important that all staff cooperate. Many may provide joint socialists obligations which would play their own mobilizing and disciplining role. All of this is required for the construction in Ol'gin is entering the decisive phase.

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MINSK WATER CIRCULATION SYSTEM TO KEEP LAKES CLEAN

Moscow STROITEL'NAYA GAZETA in Russian 26 Dec 79, p 4

/Article by G. Urbantsev:"The Lake Will Be Pure"/

/Text/ The creation of water circulating management systems is one of the most progressive innovations in land reclamation. Such a system was designed at "Leninskiy put' " (Leninist path) kolkhoz of Myadel'skiy Rayon, Minsk Oblast on an area of 860 hectares. It includes a backwater installation on the Rayevka River for holding back run-off from the water-collecting area, a filling pond and a 700 m^3 capacity polder.

In the vegetation period, relates chief engineer of Belgiprovodkhoz, P. Lapchuk, all of the runoff from the fields, carrying part of the fertilizers and toxic chemicals, is accumulated in the backwater installation and is pumped into the filling pond. From here, it is returned to the irrigation network.

The authors of the project calculated that the creation of the filling pond permits conservation of the water supply of lake Myadel' and the underground waters associated with it while the water return system prevents pollution of it from drainage run-off.

However, the originality of the system is not only in its engineering system. The designers recommend no application of any fertilizers on snow cover and the use of nitrogen fertilizers in the spring instead of in the autumn, and the use of only short-term action herbicides and toxic chemicals. There is planned creation of a 1 kilometer wide protective zone for holding back solid particles from erosion.

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USSR

REDUCTION OF ASH EMISSIONS AT KAZAKHSTAN THERMOELECTRIC POWER PLANT

Alma-Ata NARODNOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 10, 1979 pp 73-74

[Article by V. Sofrygin and N. Firsov, engineers]

[Text] Dozens of boiler assemblies are being equipped with dust catchers according to projects of the republican specialized enterprise "Kazenergonaladka." The introduction of designs of dust catcher devices with Venturi tubes (coagulators) instead of ethically and physically obsolete dust catchers (TsS-VTI, MP-VTI, multiple cyclones and individual types of electrofilters) permitted improvement of trapping light ash at Kazakhstan thermoelectric power plants up to 96-97 percent and the 2-3-fold reduction of emissions into the atmosphere.

According to present legislation of the USSR, the maximal concentration of light ash at the breathing level should not exceed 0.5 mg/m^3 of the surrounding air. In order to ensure sanitation norms in the region of a TES [thermoelectric power plant] at the existing heights of smokestacks and with consideration of background pollution, the required degree of purification should be no less than 98.5 percent.

Today, there exist some decrees concerning the increase of the degree of catchment of light ash in wet dust catchers which ensure such a degree of purification. These include the use of a multi-entry scrubber with an internal packing piece; increased water pressure up to 20-25 kgs/m^2 on the Venturi irrigation tube; organization of a 2-step layout with Venturi tubes.

We shall discuss briefly these methods of dust collection.

1. The layout with the multi-entry scrubber and the internal packing piece was developed with the participation of the Kazakh Scientific Research Institute of Power Engineering laboratory of thermal physics and introduced at BKZ [Barnaul Boiler Plant]--160-100 F station No.5, 6 of

Alma-Ata GRES /State Regional Electric Power Plant/. It consists of one 4-entry circular scrubber with superposition of circular, vertical Venturi tubes from the fourth. The degree of purification, according to an experiment in operation of analogous devices at Primorsk GRES is 98-98.5 percent.

The scrubber (diameter = 5.0 m and height = 14 m) has an internal cylindrical 2.1 m diameter insert situated concentrically to the scrubber housing. The scrubber and the insert are situated on a concrete foundation without supporting metal structures. The concrete foundation is filled so that it is, simultaneously, a foundation for the scrubber and so that it permits organization of the discharge of ash pulp through 2 hydraulic seals. Under such an arrangement, the ash catcher (one scrubber, F5.0 m instead of, as a rule, four F2.3 m)clears the platform to practically the zero mark in the zone of installation of the scrubbers. The conditions of servicing, repair and the sanitary condition are being improved. Metal expenditure and the volume of construction and installation operations are being reduced and the reliability of operation of the device is being increased due to the reduction of the number of separate elements (scrubbers).

2. The increase of the degree of ash removal from flue gases up to 98.5 percent with a wet method of ash catchment with the use of Venturi tubes may be achieved by feeding a spray of water insreased up to 20-25 atm. pressure. With consideration of the experimental experience of the Kazakh NII /Scientific Research Institute of Power Engineering/ plant and our enterprise, there was developed and introduced a scheme of increased pressure of water for irrigating the Venturi tubes of boilers of TsKTI /Central Committee of Heavy Industry/ /5-39 F stations No. 1-/.3 and boilers of PK continuously operating coil boiler - 19, stations No. 4-6 of Leninogorsk Thermoelectric Power Plant.

The tests conducted indicated that the degree of catchment of ash from flue gases increased from 96 percent to 98.2 percent and the hydraulic resistance of the ash catcher was reduced to 20-30 kg (force)/m^2. For increasing the degree of ash removal from flue gases by dust catchers with Venturi tubes, water at high pressure is being introduced at Alma-Ata TES, Pavlodar TES-3 and others.

3. Combination layouts. There is the prospect of increasing the degree of ash removal from flue gases by a scheme which is being used at high power plants and modular stations. The specialized trust "Soyuzgazoochistka" with participation of the department of the chief designing engineer of "Kazenergonaladka" are developing drawings of a combination scheme of gas scrubbing for block No.11 building "A" of the Yermak GRES. According to this layout, in front of the first field of a 3-field electrofilter, at the spot of the dismantled cyclone dust separators,

six 3600 mm scrubbers 12,800 mm high are established. The expected degree of scrubbing, according to operating experience and data of tests of analogous devices, is not less than 99 percent.

The department of the chief designing engineer is working up a plan of use of ash wastes in the national economy. Specifications have been compiled for dry ash waste from the PK-19 boilers of stations No. 4-6 of Leninogorsk TES for the needs of a polymetallic combine. In the gas line behind the air preheater is installed a baffle separator lattice (concentrator). The dustiest part of the flow which constitutes 10-15 percent of the overall volume of gases is fed into the dust catcher. The dust catcher is an "Anticyclone" (L.1) into which the dusty stream enters along a vertical gas line, while purified gas is drawn off through a gas line, fastened to the side. Discharge of gas from the "Anticyclone" is provided in a gas line of the boiler in front of the dust catcher. The gases pass through the tract because of the individual exhaust apparatus. The designed quantity of ash from one boiler is 9000 tons/year.

In association with the tightening of environmental protection norms concerning light ash emissions and the necessity for burning water polyhydrate coals, there arises the question of creating ash catchers (or modernizing existing ones) with a degree of purification of not less than 99-99.5 percent. For this purpose, there is proposed the use of products developed by the department of the main designer of the specialized enterprise "Kazenergonaladka" a combination layout of gas scrubbing, irrigation of the Venturi tubes with water at high pressure and 2-step purification and the progressive achievements of science and technology in the area of gas scrubbing.

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BRIEFS

A STRONG TYPHOON--A typhon passing over the Primor'ye caused considerable damage. Heavy rains fell over Khasanskiy, Spasskiy, Nadezhdinskiy, Shkotovskiy, Partizanskiy, USSuriyskiy, rayons of the Primor'ye. Rivers flooded their banks. Pacific Ocean seamen and frontier troops were the first to reach and help the victims of the typhoon. Floating armored personnel carriers, powerful engineering equipment brought aid to the sufferers and brought materials and medical supplies to the flooded area. The subdivision commanded by ensign B. Aykarov, was given the task of restoring electrical lines for important industrial objects. The work of these troops was complex and difficult. The wind knocked down poles, broke and tangled wires. The troops displayed courage and self-control in their struggle with the elements. They completed their mission in the shortest possible time. The marines, military-construction troops, aviators and frontier guards reinstalled the telegraph and cleared uprooted trees from the highway. Distinguishing themselves in this operation were the troops of subdivisions commanded by major V. Krasnov, Captain B. Vikulov, senior lieutenant A. Lenisenko. The troops and the inhabitants repaired the effects of the storm and life has returned to normal. /Text/ /Article by V.Polishchuk, Captain 2d Rank/ /Moscow KRASNAYA ZVEZDA IN Russian 25 Aug 79, p 3/ 2791

SECOND LIFE OF WATER--Scientists of the Ukrainian Academy of Sciences have proposed a fundamentally new approach to the purification of drinking water by the recovery and repeated use of technical and industrial waste waters. Looking at the problem in a new way provided an original theory developed by UkSSR Academy of Sciences member L. Kul'skiy. Admistures capable of polluting water were classified according to the phase-dispersion state and placed in one of a small group of classifications. Standard typical elements for removing each group of admixtures from water were developed. No matter how complex the components found in industrial waste waters, it can be given a second life, returned to transparent radiance if you pass it through the standard typical purification elements, combined, in dependence upon the admixtures, into this or that sequence. At the UkSSR Academy of Sciences Institute of Colloid Chemistry and Chemistry of Water, where L. Kul'skiy heads a department, apparatus and methods of purification, which make possible element construction of water purification devices are underway. Apparatus and methods of purification were checked under industrial conditions at water conduit stations and industrial enterprises. They have proven themselves splendidly. Standard typical purification elements make unnecessary design and construction of individually developed purification installations. /Text/ /Article by S.Tsikora, "Izvestia" correspondent, Kiev/ /Moscow IZVESTIYA in Russian, 1 Nov 79, p 1/ 2791

PURE AIR OF THE STREETS--Air pollution in the Kishinev (Capitol of Moldavia) air basin has been reduced 2½ times in the last 5 years. This was promoted by a complex of an environmental protection program of this large industrial and cultural center of the country. The state sanitary selection service supervises the maintenance of pure reservoirs which create a favorable microclimate in the town. /Text/ /Moscow IZVESTIA in Russian, 9 Dec 79, p 3/ 2791

FIVE STATIONS FOR INGURI RIVER--Tbilisi, 20 Dec--A cascade of five hydro-power stations will be erected on the Inguri River in Georgia, a Soviet Transcaucasian republic. The construction of the first one is coming to an end and it will soon be put into operation. Its capacity will reach 1.3 million kilowatts. The Inguri is a mountain river with a large variety of heights. A chain of reservoirs will be created here which will make it possible to nearly double the river's natural energy resources. The Inguri cascade will provide Georgia and adjacent areas of the USSR with energy for a long perspective.—NAB/Tass [Text] [Rangoon THE WORKING PEOPLE'S DAILY in English 22 Dec 79 p 6]

CSO: 1812

FRANCE BLAMED FOR POLLUTING NEIGHBORS' AIR, WATER

Frankfurt/Main FRANKFURTER RUNDSCHAU in German 12 Jan 80 p 3

[Article by Erich Hauser: "European Environmentalists Have a Dislike for France. In Four Border Bezirks French Companies Put a Burden on the Ecology of its Neighbor Countries"]

[Text] In four different instances, the French government and the national assembly have shown, within a few weeks, how little they think of European environmental protection.

In Cattenom, close to the border with the Saar and Luxemburg, four nuclear power plants with a total capacity of 5,200 megawatts are being built: starting in 1990, their heated cooling water will be emptied into the Moselle.

In Saargemuend, in the same corner of France, an accumulator factory is under construction: its lead-containing waste gases will not be filtered by the most modern process available; they will fall on the Saar whenever the wind blows from the southwest.

The national assembly refused to ratify the Bonn agreement, by which France had pledged to the other countries along the Rhine that it would progressively reduce the amount of salt dumped into the river by the Alsatian potash mines.

Cracks in the cooling system of the two French nuclear power plant units at Fessenheim did not bring a temporary shutdown of the reactors. The power plants at Fessenheim, too, are close to the German border.

When the European parliament examined the non-ratification of the Bonn agreement on the amount of salt in the Rhine, on 14 December, the French communist EC-representative Wurtz supported the typical opinion that this is no concern of the EC's and of the European parliament's, but a purely national question. Just as French communists and intellectuals across the Rhine like to feel as the spearhead of social progress in Europe and to heap insults on the alleged democratic underdevelopment of the FRG, they also pay tribute to national sovereignty and the French government's objective to ensure France's independence through massive nuclear energy development. The essential is to achieve greater economic power than the FRG.

In France, just as in other Romance countries, but also in Great Britain, the "green movement" of the environmentalists has remained comparatively weak until now. In addition to a traditionally unromantic attitude toward nature, the much more pressing problem of unemployment obviously also plays a role in these countries, as does the lesser density of population of many regions. The people most conscious of environmental protection in Western Europe, besides the German, are the Dutch, the Scandinavian and the Swiss--in short, the "rich countries." In the case of potential lead pollution by the accumulator factory in Saargemuend, the deciding factor for the local population is obviously the creation of 600 new jobs. The structural crisis in the steel industry in the Saar has also deprived many inhabitants of Lorraine of their earnings this side of the border.

The EC is the natural lever to implement a Western European environmental protection policy. Years ago, the German energy commissioner, Guido Brunner, called for joint planning in the selection of nuclear power plant sites. But the matter was not so pressing then, even in the FRG: at that time, a nuclear power plant was planned at Whyl in Baden-Wuerttemberg almost right opposite Fessenheim.

However, while environmentalists of the three countries were demonstrating their solidarity in European environmental consciousness at Whyl--and at Kaiseraugst, Switzerland--and thwarted the projected construction, the French riot police showed the European demonstrators gathered at the construction site of the Creys-Maville fast breeder reactor in 1977 that it could strike still more brutally than its West German counterpart. Recently planned demonstrations at Cattenom were prevented already at the border customs barriers of the French republic.

In the past years, the Council of Ministers of the EC has been able to achieve a few things in certain areas of environmental protection, but this has always met with resistance from France and Italy, to a certain extent from the FRG and, in a few instances, exceptions had to be made for Great-Britain and Ireland. For many guidelines concerning the prevention of water pollution, besides the EC commission, the Dutch were the driving force, because they get their drinking water indirectly from the waste waters of other countries bordering on the Rhine. More than anybody else, they are to be thanked for the prospect that over the years the Rhine may become unpolluted again--as far as chemicals, and industrial or municipal waste waters are concerned.

In order to include Switzerland, two agreements between all bordering countries were signed in Bonn. But the European community as such is a party only to one--on chemicals--, not in that on salts which the French parliament refused to ratify. Paris had taken the precaution of preventing EC participation.

The EC is also a party to agreements for the prevention of water pollution in the North Sea and in the Mediterranean. Nevertheless, it is to be feared that the Mediterranean will increasingly become a waste pond, since most of the countries on its shores have yet to industrialize and since, for the time being, jobs remain more important than a clear sea. Only a massive exodus of tourists appears capable of stopping the pollution and destruction of the shores.

Paris has shown unilateral enthusiasm for environmental protection only once, after the "Amoco-Cadiz" had seriously hurt tourism on the coast of Brittany. However, since Europe's prosperity depends on oil, the nine could bring themselves to take only very limited measures. Extensive proposals including safety regulations for tankers, such as double ship bottoms or tank walls, which would have stimulated the stagnating shipbuilding industry for years, failed because of opposition, the motives of which (for all oil shipping companies) are easy to guess.

The warming up of rivers through the cooling water from nuclear power plants is also not yet covered by an EC guideline. Caught between OPEC countries and environmentalists, the EC governments do not want to make the problem of energy supply still harder for the EC by issuing regulations of their own. There are many indications that the FRG counts on the planned massive nuclear energy development in France and in Eastern Bloc countries to force West German environmentalists too to revise their position some day if energy prices continue to rise. The FRG, an industrial country, is unthinkable as a "green island" and objectively does not make sense.

How far unconditional environmentalists in the FRG manage to propagate their ideas west of the Rhine, east of the Elbe and south of the Alps could in fact become a crucial test for them in a few years from now. But the federal government could make many things at home easier by taking progressive bilateral initiatives in this field, within the EC and with neighbor countries. One cannot deny that more must be done for environmental protection at the European level.

9294
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FEDERAL REPUBLIC OF GERMANY

PROPOSED LAW ON ENVIRONMENTAL CHEMICALS VIEWED INADEQUATE

Hamburg DIE ZEIT in German 28 Dec 79 p 50

[Article by Wolfgang Faigle]

[Text] Danger lurks in gas stations and metalworking plants, behind the tar machines of road building groups and in the missing boilers of the plastics industry: the danger of becoming a victim of a certain type of cancer, because of a certain activity.

The fatal linking of work place and tumor victims is not new: in 1775 the London doctor Percival Pott had already observed the higher incidence of testicular cancer in chimney sweeps. Pott drew the correct conclusion: occupational cancer from the effect of soot.

Since that time many relationships between cancer and certain professional activities as cause have come to light. Doctors discovered connections between bladder cancer and the production of the artificial red dye, fuchsin between X-rays and skin cancer, between benzene in gasoline and leukemia ("blood cancer"), between chromates, nickel or asbestos and lung cancer. The latest spectacular case was recently the headlines made by vinyl chloride, the basic material for the universally used plastic PVC: vinyl chloride causes liver cancer.

The official figures gloss freely over the seriousness of the situation. In 1977, there may have been in the entire FRG, 50 cases of job-related cancer altogether: this would represent only 0.03 percent of the 150,000 FRG citizens who became victims of cancer that year. But an official American study of fall 1978, referred to German conditions, could indicate even 50,000 victims of job-related cancer. Nobody knows the correct value. But there is much to indicate that the 50 cases, which were detected for the first time in 1977, amount to only a tiny fraction of the actual occupational victims.

Up to now it appeared that the problem of job-related cancers was underestimated by orders of magnitude. The time has therefore come to act on the legal level. Thus the widely debated "Law for Protection Against Dangerous

Chemicals," currently referred to as the Environmental Chemicals Law, is before the corresponding Commissions of the Lower and Upper Houses of the FRG Parliament. But this law is no less important for work places as for the environment. For the rest, some decrees of the Government Bill are drawn up in such a manner that they are suitable for the environment, but not for industrial protection.

A Terrible Result

Bonn's actions come late, too late for some workers. Almost all known cases of job-related cancers were detected more or less accidentally, specifically, when the relationship between occupation and disease could no longer be overlooked. The list of the "Maximum Permissible Work Place Concentration" (MAK list), the official German classification, contains, in the latest edition:

--14 substances "proven by experience as capable of inducing malignant tumors in man" (A1 substances);

--29 substances, "which so far have proved, in the opinion of the commission, to be clearly carcinogenic in animal tests," broadly "in conditions comparable to the possible exposure of humans at work site" (A2 substances);

--32 chemicals for which "there is suspicion of a considerable cancer inducing potential and which urgently require further research" (B-substances).

The MAK list cites altogether 75 hazardous substances. Of these substances, 5 in the second and 12 in the third were only added this year. In all probability, the list will quickly increase: in the opinion of the International Cancer Research Agency in Lyon, 26 substances are certainly carcinogenic for man, almost twice as many as on the German list. And the U.S. National Cancer Research Institute in a survey of the literature, came to the conclusion that of the 7,000 substances studied so far, 600 to 800 are suspected carcinogens. These figures show at least that no one knows even approximately the potential hazard, and that the latter is probably greater than was previously assumed.

The suspicion, that a substance may be carcinogenic is mostly based on animal tests. Besides the latter, for some years now tests have been conducted with bacteria, which entail only low costs and can be developed relatively quickly.

The results of animal and bacteria tests can be applied surprisingly well to man. Almost all the substances which cause cancer in humans have the same effect on animals. The Wuerzburg toxicologist, Dietrich Henschler, chairman of the MAK Level Commission, estimated that the consistency was 98 percent. It had already been known for some time that several substances causing cancer in people, for instance vinyl chloride, are carcinogens in animal tests. It appears quite likely that acryl nitrile, a raw material in the production of plastics, will be the next example.

The validity of bacteriological quick tests is very good: scientists have reported 80 to 90 percent consistency between these tests and animal experiments. The tests may be used as a very applicable first indication of a possible cancer hazard, which would then be investigated more closely in the detailed animal experiments. Of course, experiments take months, if not years.

It would only be possible to prove with considerable difficulty, if at all, by statistical studies whether or not a certain substance is a carcinogen for man. In the United States, in Great Britain and in the Scandinavian countries, such epidemiological studies have been customary for years. In this area, the FRG is more similar to the developing countries.

Epidemiologists are faced with the great probelm of obtaining reliable data over processes which started a long time ago. For example, for the purpose of such investigations, it would be very useful if the FRG had a comprehensive Central Cancer Register in which, besides the cause of death, the previous occupational history of the deceased were also to be entered. Up to now the main obstacle in the path of such a card-index was confidentiality of the data. But the required data could easily be processed anonymously.

Researchers also have the opportunity of selecting a certain test group, and to observe it in future, a project used for the decade-long search for carcinogens. These and other difficulties make a watertight epidemiological investigation extraordinarily costly, and it is all too easy to find fault with it, if the result does not suit someone.

For example, an extensive study had been conducted last year by three U.S. governmental institutions. The result was terrible. Between 20 and 40 percent of all cancer cases which are to be expected in the United States in the immediate future are related, according to the study with job-related damages, and this would apply even if we were only to consider the case of substances which have been proven carcinogenic for man.

Naturally, the institutes did not state that all the "job-related cancers" would fail to occur, if there were no occupational effects. Specifically, several damages are often associated. The scientists "only" say, that the victim's occupation would contribute greatly to his disease, and that is bad enough.

Within a few weeks the American industry concerned published a rebuttal which declared that the institutes' figures were wrong all round, while the industry prudently refrained from mentioning any figures of its own. For the rest, a counter expert, engaged precisely for this purpose, arrived at the result that the real figure of job-related cancers should probably be between 10 and 33 percent, perhaps even higner. It was very embarrassing for the industry when this study was finally made public.

But the risk actually prevalent now may be less than the one calculated by the U.S. institutions. This is because the work conditions today are much better than at the time when these cancer diseases were caused, and which are now used as statistics. On the other hand, there are probably many, old and new, work-place carcinogens which are totally unknown for the moment.

When people hear of work places with cancer hazards, they usually think of the chemical industry. But this is only partially correct. A chemical endangers the receiver at least as much as the sender, the more so as the former as a rule knows much less exactly what he has in his hands and how he should handle it.

The Professional Association of the Chemical Industry is attempting at the present time to determine exactly how many workers have been exposed to known carcinogens in their sector. The first phase of this program refers only to the substances of the A1 category. Result: 16,851, a figure which is probably nothing more than wishful thinking. The occupational disease expert of the German Federation of Trade (DGB), Reinhold Konstanty, evaluates this figure in very different orders of magnitude: "At least several million work places are exposed to a cancer hazard," altogether, not just in the chemical industry.

Haggling Over the Maximum Permissible Values

Whatever the correct figures may be, it is high time for the relevant legislation to be enforced. It will then have to be seen whether the situation is then improved.

The "Law for the Protection Against Dangerous Chemicals" (the Environmental Chemicals Law) provides, among other things, for notification regarding substances on the market. It should be noted that only a notification is mentioned, not a license.

The method of notification must be divided into several phases. If a substance is to be "put into circulation" (according to the special German legal terms) in an amount of less than 1 ton per year, there is no need of any notification (the reference draft provided for this category one-tenth of a ton annually). In case the amount is more than a ton per year, there should be a "basic test," in case of more than 100 tons a year, the testing would be more thorough. Only in cases referring to more than 1,000 tons per year do the legislators prescribe a comprehensive investigation. This highest level is reached actually by possibly less than 5 percent of all the substances concerned.

The individual threshold values, for which the various tests should be carried out can be implemented at an earlier date by the Registry Office. On the other hand, the presentation of test records may be not required at all, "if it is not necessary according to the scientific position in this area."

The specialized periodical NACHRICHTEN AUS CHEMIE, TECHNIK UND LABORATORIUM is recommending now that every individual test be bargained about.

The classification concept may be insidious from the point of view of the protection of workers. A substance which is produced only in small quantities and is very reactive, need not be very dangerous at all to the environment, but may have really fatal effects at the work place, for instance dichloredimethyl ether, "which is in general the strongest synthetic carcinogen known to date" (Henschler); it causes lung cancer.

Another controversial point which was given hardly any publicity is causing great anxiety to the presumable head of the new registry office, the Dortmund scientist in industrial hygiene, Uwe Woelcke: What is secret and what is not? This includes the question as to the extent a worker is informed of the danger of the substances.

The draft law makes specific provisions that hazardous substances be designated accordingly; for the moment, however, there is no "carcinogen" warning sign. Suspicious substances are designated by the comparatively harmless sounding multipurpose label "harmful to health." Anyone trying to change this will have to go further, to the European Community. They are talking of a designation by numbers which would perhaps indicate a set of warnings listed somewhere.

It could now be understood, that the Registry Office knowing of the danger warning for a certain substance must keep the secrecy if an official learns of company secrets. But what is secret in the eyes of the industry is to be found in an internal legal opinion of the Association of the Chemical Industry (VCI): almost everything.

It seems indeed hardly probable that the producers will have the warning label particularly conspicuous. A spokesman for the VCI said that: "One death's head too many would be absolutely fatal for a product on the market." That is true, but one death's head too few could be fatal to the buyer.

Perhaps it would still be possible to insert in the law a paragraph specifying what the authorities should be able to pass on. To the great displeasure of the Council of Experts, the draft law provides, specifically, that the evaluation of new chemicals should not be assured by a group of scientists, but would be entrusted to altogether five of the most senior federal authorities: the Federal Office for Industrial Safety and Prevention of Accidents, the Federal Institute of Biology, the Federal Office for Environmental Protection, the Federal Ministry of Health and the Federal Institute for Materials Testing.

Nevertheless Woelcke expected that, outside routine work, in particularly critical cases, the concentrated expertise would be obtained from the Scientific Commission, if it were not forbidden. Neither the EC Directive nor the German law linked with the latter provide that independent scientists should examine the data notified: "company secrecy!"

All the discussions cannot blind us to one fact: In its present form, the Chemical Law is a real paper tiger, imposing from far, but only half as fierce when seen more closely. It will lead but rarely to strict measures for the work place and the environment. For the rest, many provisions could be interpreted in such a manner, that they could have a predominant effect on decisive decrees: This would be preeminently a matter of political intentions.

Another comparatively unknown regulation should have a much sharper impact. An appendix to the Regulations on Work Materials provides for the first time concrete instructions on the procedures to be followed for carcinogens.

According to the intensity of their carcinogenic effect, the A1 and A2 substances were divided into three groups. According to the classification, a series of measures of different strictness are listed. Economic reasons are also involved obviously in this classification. Asbestos, perhaps the strongest carcinogen at the work place in general, was only entered in group 2, because the more severe regulations of the first group would have raised difficulties for an entire branch of industry, with a turnover amounting to billions. The draft ordinance reads: "Classification in Group I is planned in the future." This could be a long time coming.

Save What Has To Be Saved

According to the classification of the individual carcinogen, instructions and the need of approval are provided. Furthermore, the concentration of the hazardous substance at the work site should be monitored (a regulation which can hardly be implemented practically with the required quality), the workers concerned should submit at regular intervals to medical examinations, the company must carry out a large number of simple hygiene measures.

The permissible carcinogen concentration at the work place is the "Technical Guideline Concentration" (TKR). This is a political value which the state, the professional associations, the employers and, with considerable underrepresentation, the trade unions, according to not totally clear criteria settle upon in the "Committee for Dangerous Work Materials." The TRK includes among other things the "Level of Technology" whatever that may be. Professor Henschler, expert in the area of MAK levels considers it as "a value too strongly influenced by economic considerations."

There is probably no such thing as a harmless dose for a carcinogen. At least no one has been able to find one so far. Many of the slight injuries from various carcinogens contribute to the total risk, if they do not even mutually increase each other's effects.

Nevertheless this Appendix to the Ordinance on Work Materials is a step in the right direction. The surest means of reducing the cancer risk at the work place, is to do away with the cause. The replacement of cancer inducing substances by harmless substances is therefore assigned a prominent role in the draft ordinance. If with the best of wills this is not possible, the worker exposed to danger should be monitored regularly, so that any possible disease would be diagnosed early. Only then could medicine's healing be used in the attempt to save, what has to be saved.

At present however, the priorities are still reversed.

9018
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ANCIENT MONUMENTS THREATENED BY QUARRIES

Athens I KATHIMERINI in Greek 17 Jan 80 p 10

[Article by Athina G. Kalogeropoulou]

[Text] What the friends of Aigina are complaining about in their many letters is unbelievable: two quarries (there may be others also) are operating on the island, but we shall refer particularly to one only 900 meters away from the archeological area of the Afaia Temple in Messagors and to a second one (which rumor has it operates without a license) near the Agios Nektarios Monastery opposite Palia Khora.

Both these archeological areas--the Afaia Temple and Palia Khora--are two Aigina sites closely intertwined with the island's ancient history and its life in the Middle Ages as well. And it should be pointed out from the very start that the Ministry of Civilization and Sciences has exerted every possible effort and has made repeated protests pointing out the following:

"The quarry operating near the Afaia Temple--a masterpiece of classical architecture which is kept in sufficiently good condition--has done serious damage to it as a result of the vibrations caused by the repeated explosions. For many years the Antiquities Service--the Second Antiquities Inspectorate and the Antiquities Administration--has fought to stop the quarry operation but without result.

"Yet, there is a law preventing the licensing of inactive quarries in areas where their exploitation could cause damage to archeological, tourist or other public benefit areas, or could bring about serious changes to the natural and cultural environment."

Sinking Steps

Anyone who has visited even once the Afaia area cannot help but remember the wonderful pine tree grove which surrounds the exceedingly beautiful hill. The quarry's operation is seriously ruining the natural environment (dust settles continually on the pine trees) and systematically destroys the greenery as the quarry area expands. On the other hand, a report prepared following an on-the-spot investigation by the authorities--with the participation of a Ministry of Industry representative--clearly points out the damage the Afaia Temple suffers daily as a result of the vibrations: "The quarry vibrations resulting from the use of explosives have caused the temple's foundation steps to sink and the cornice joints to expand. They have also caused cracks in the temple's columns."

Have we so many monuments in our country that we try, despite the aforementioned findings, to completely destroy such an ancient temple?

The case of the Palia Khora quarry is a curious one. It is said that no license for the operation of this quarry was ever issued and the official of the Antiquities Inspectorate is wondering how the quarry owner gets the explosives! Its operation was prohibited by a presidential decree (Government Gazette 37/A/21 February 1976)!

A Permanent Wound

Reports by landscape architects and ecologists point out that besides the visual pollution which is clear to those traveling by boat toward Agia Marina, the continuous excavations have caused a permanent wound in the mountain, a wound which is becoming larger and larger. The dust clouds cause atmospheric pollution. The material wastes are being thoughtlessly deposited on the south side of the mountain and give the impression of a lunar landscape! Since the area lacks dense greenery, Palia Khora cannot regain its former view even though the area possesses its own unique character.

Palia Khora is known as the "Mystras of Aigina" [Mystras--an area crowded with monasteries]. The ultimate result then is very evident when the nearest of the many tiny churches is only 500 meters away from the point of explosions. The nearly 30 monasteries suffer damage such as wall cracks, fresco distortions and, in general, one gets the impression that this is an area hit by earthquakes!

Worse still, the "eating into" the mountain has taken on such proportions that the optical pollution is clearly seen from the other side of the mountain also, while the dust clouds caused by the explosions can be seen from any point of the island--even from the Afaia Temple.

The Afaia and Kolona areas and the Temple of Ellanios Dios and the Palia Khora are the four sites where old monuments in the history of Aigina are maintained. Shall we continue toward the destruction of the two? One wonders!

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BRIEFS

AIR POLLUTION IN LISBON--According to recent information, the pollution of Lisbon air has been surpassing the levels considered tolerable by technicians of the World Health Organization. A large portion of these pollutants are emitted by diesel powered automobiles. For some time now the commercial district of Lisbon has registered 372 micrograms of sulfur dioxide (which is highly toxic) per cubic meter of supposedly breathable air. Air pollution has begun to seriously worry environment technicians without, however, this level of concern existing within the government. As a result, there is no up-to-date legislation that would do away with diesel engines, substituting them with [propane] gas engines, and requiring filters that would reduce automobile exhausts, as already occurs in some countries. [Text] [Lisbon EXPRESSO in Portuguese 19 Jan 80 p 2 WA]

CSO: 5000

SPAIN

AIR POLLUTION IN MADRID, BARCELONA REACHES DANGEROUS LEVELS

Madrid EL PAIS in Spanish 29 Nov 79 p 1

[Text] Both Madrid and Barcelona touched, even though they did not fall below, minimum standards for contamination, or what is regarded as a "first-degree state of emergency," which is far beyond tolerable limits for a 24-hour period. The immediate consequences, should the present weather prevail (an anticyclonic system) might well be a drastic reduction in the use of heating devices as well as strict traffic control in the center of each of the two cities.

In Madrid, four pollution control and checking stations (Colon, Quevedo, Castilla Square and Fernandez Ladreda) by nightfall were reaching the red danger point of 600 micrograms of particles in suspension per cubic meter (smoke), and 900 micrograms of anhydrous sulfur per cubic meter produced basically by heating devices. In Barcelona, the indices were the same in at least two places: the sensors located on Calle Abierta and on Borbon Avenue. These figures, according to the standards set by prevailing Spanish legislation, are approximately twice the level tolerated for a single day.

Even though the civil authorities of Madrid and Barcelona--who are legally responsible for measures in such cases--preferred not to "make a federal case" of the subject, partly in the hope that there might be a sudden change in weather conditions--regarded as unlikely in the next few days--the heads of both governments, Messrs Roson and Benlloch, respectively, last night had before them on their desks a series of measures for immediate enactment.

These deal with restrictions on the use of domestic fuel-oil burners, both public and private, which are to be limited to 10 hours daily (from noon to 2200 hours) and strict controls over the circulation of private vehicles in the center of both urban areas. This measure--which would be taken jointly with the public awareness--presupposes severe restrictions on parking on all city streets, with a view to cutting down on private tourism. The set of measures could even include the banning of privately owned diesel-fueled vehicles.

A third measure, and this one for the medium term, would compel public transport and taxis to use LPG (liquefied petroleum gas). Informed sources told EL PAIS that in Spain the legislation on this subject is excessively

tolerant, and at least inadequate. In the draft environmental bill which the government promised to submit to Parliament in December, it is hoped that there will be a substantial reduction in the tolerable 24-hour period levels (currently 300 micrograms per cubic meter) for smoke which should be about 100 micrograms, more in keeping with current European legislation.

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SPAIN

BILBAO AIR QUALITY REPORTEDLY VERY BAD

Madrid EL PAIS in Spanish 30 Nov 79 p 21

[Article by Javier Angulo]

[Text] Bilbao--Yesterday the pollution level was down appreciably in Bilbao. Two days earlier, emergency measures were taken by the government and public health authorities but despite the decline in the high concentration of anhydrous sulfur in the capital of Biscay Province, the air yesterday was almost unbreathable, due also the dust in suspension, the nitrogen oxide, ozone and hydrocarbons. Several people received medical attention in the hospitals because of respiratory problems.

The measure adopted last Wednesday by the civl authority of Biscay Province, requiring the use of light fuel oil by some 15 of the most important industries located in the Nervion River Basin (in the Bilbao estuary)--among them Altos Hornos, Sefanitro, Echevarria and Petronor--brought about a rapid improvement in the environment. The level of anhydrous sulfur which in some parts of Bilbao was above 1,000 micrograms per cubic meter (the legal tolerable limit is 700 micrograms, while the emergency conditions show approximately 1,500 micrograms) were finally effectively lowered by the end of the day.

Yesterday, the levels remained above 500 micrograms per cubic meter--hourly measurements--at most of the eight automatic measuring stations for anhydrous sulfur operated by the Greater Bilbao Corporation. Light gusts of southerly wind contributed to a noticeable reduction in this source of pollution.

In any event, and despite the bright sunshine, Bilbao yesterday appeared to be wrapped in a sort of fog. In addition to the pollution caused by the sulfur, there was a dense cloud of dust in suspension in the air which far exceeded the tolerance limits established by the law. In some parts of Bilbao, there was as much as 740 micrograms of nitrogen oxide per cubic meter. Yet the limits stipulated by law for a first-degree emergency stand at 365 micrograms per cubic meter over a 24-hour period.

The great stench and the dust in the air yesterday provoked coughing, smarting eyes and respiratory complications for many of Bilboa's inhabitants. Hospitals, clinics and doctors in their offices in the capital of Biscay Province treated patients with respiratory problems--all common in a city where for half of the year the pollution levels are high. Nevertheless, considerably fewer patients were treated than on last Wednesday, when the seriousness of the situation compelled the Civil Governor of Biscay to send out an alert, via the Territorial Public Health Group, to hospitals and clinics to put all their artificial respiration equipment in working order.

Expert meteorologists consulted yesterday by EL PAIS stated that the high pollution indices recorded over the last few days in Greater Bilbao had been caused by very substantial thermic investments which led to an exceedingly sharp imbalance between the temperature at ground level and that recorded at higher levels.

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